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The number of Americans with heart failure is projected to rise by 46% over the next twelve years.¹

The result will be 8 million people in the United States suffering from a condition in which their heart is too weak to pump blood throughout the body.

One reason for the increase in failing hearts is that more people are surviving heart attacks. Damage inflicted by heart attacks can create heart failure in later life.

Growing epidemics of obesity and diabetes along with the aging population are contributing to this heart failure epidemic.

Encouraging news was published last year in the New England Journal of Medicine. A review of clinical trials spanning the period of 1995 to 2014 found a 44% decline in sudden death rates among heart failure patients.²

The authors of this study attribute this striking 44% decrease to improvements in conventional treatment. We at Life Extension® agree that there have been remarkable advances in conventional protocols.

What the analysis published in the New England Journal of Medicine overlooked is the explosive growth in coenzyme Q10 use that occurred during the period corresponding with the 44% decrease in heart failure death rates.

To put this into perspective, a survey published in March 2015 found that 71% of cardiologists recommend coenzyme Q10 to at least some of their patients. This same survey showed that CoQ10 was the top supplement suggested overall by cardiologists.³

Tying this together was a study published in December 2014 showing that when CoQ10 was added to conventional therapy, there was a 44% reduction in cardiovascular mortality amongst heart failure patients.⁴

To summarize, the New England Journal of Medicine published a study in 2017 showing remarkable reductions in heart failure mortality, but failed to mention that CoQ10 is rapidly emerging as part of standard therapy.

This article will review data that further validate the importance of CoQ10 in maintaining heart health.
Preserving Cognitive Function

Heart failure patients suffer diminished blood flow to the brain, along with other pathologies that impede cognitive functions.

An observational study analyzed blood samples from 40 healthy controls and 36 heart failure patients and found:

- Heart failure patients had worse attention and executive function.
- Lower CoQ10 blood levels predicted worse performance on attention tests.

The authors of this study speculated that:

“...increasing plasma CoQ10 levels may be a reasonable first step in improving cognitive function in older HF [heart failure] patients.”

Combatting Insulin Resistance

Normal aging, diabetes, and obesity contribute to cellular resistance to insulin. The result is chronically elevated glucose and insulin blood levels.

Excess glucose and insulin contributes to virtually every degenerative disorder.

In a randomized controlled trial of overweight and diabetic patients with coronary heart disease (aged 40 - 85 years), 30 patients received 100 mg of CoQ10/day for eight weeks and 30 received placebo.

The results showed that CoQ10 supplementation reduced serum insulin levels and improved insulin resistance.

Pancreatic beta-cell function also improved in the CoQ10 arm of the study which enables more efficient insulin production.

Reducing Lipoprotein (a)

There are sophisticated blood tests that measure types of cholesterol beyond LDL and HDL. One such test is lipoprotein (a).

The Copenhagen City Heart Study found that individuals with plasma lipoprotein (a) above 104 nmol/L had an increased risk for heart attack.
In a systematic review of seven randomized controlled trials, CoQ10 supplementation led to statistically significant reductions in lipoprotein (a) levels.11
This review also found that higher CoQ10 doses corresponded with greater lipoprotein (a) lowering.

CoQ10 and Selenium

During a four-year trial, 219 elderly individuals received daily supplementation with 200 mg of CoQ10 and 200 mcg of selenium. These CoQ10-selenium supplemented individuals were compared with 222 participants that received placebo and 227 participants that received no treatment.
In participants with the lowest baseline selenium levels, supplementation with CoQ10 and selenium cut cardiovascular mortality by 50%.12

Heart Transplant Patients

The advent and improvement of heart transplant technology has given new leases on life to those with end-stage heart failure. Yet heart transplant surgery involves life-long complications from immune suppressing drugs and other side effects. There are not enough donor hearts to meet the rising needs of heart failure patients.
A growing volume of data suggests that heart failure patients can gain precious life-years by boosting their coenzyme Q10 blood levels.
An interesting study analyzed tissue from patients undergoing heart transplant surgery versus tissue from non-failing donor hearts.

Tissue from failing hearts showed significantly lower CoQ10 levels compared with non-failing donor hearts.13
While these findings are not surprising, they add to the wealth of clinical data supporting the benefits of coenzyme Q10 in those suffering with congestive heart failure.

Results From Huge Meta-Analysis

A meta-analysis of 14 randomized controlled trials involving 2,149 heart failure patients revealed that CoQ10 supplementation decreased mortality by 31% compared with placebo.14
This same analysis showed that exercise capacity improved more in the CoQ10 subjects than in the placebo group.
Ejection fraction did not improve in this analysis. One reason may be data we published in 2008 showing that heart failure patients require higher doses of the ubiquinol form of CoQ10 to improve this measure of heart pumping capacity (i.e., ejection fraction).15

The ejection fraction test assesses how much blood is pumped after each beat compared with the amount of blood remaining in the heart.16
Healthy people have an ejection fraction of 55%-75%, while heart failure patients often have values of 20%-40% (or less).16,17
In a study we reported on ten years ago, mean ejection fraction improved from a low 22% up to 39% in ubiquinol-treated patients who had follow-up echocardiograms.15 This finding represented a recovery of up to 77% in this measure of cardiac output.
To obtain these results, the study author (Peter Langsjoen, MD) identified heart failure patients with suboptimal CoQ10 levels and supplementing with an average dose of 450 mg per day of ubiquinone. Patients were then switched to an average dose of 580 mg per day of ubiquinol to maintain higher levels.
In response to these higher CoQ10 blood levels, increases in ejection fraction were accompanied by remarkable clinical
improvements in advanced heart failure patients. Based on these findings, the Dr. Langsjoen’s study group concluded:15

“Ubiquinol has dramatically improved absorption in patients with severe heart failure and the improvement in plasma CoQ10 levels is correlated with both clinical improvement and improvement in measurement of left ventricular function.”

What CoQ10 Dose Should Healthy Aging People Take?

Peter Langsjoen, MD, is one of the world’s foremost experts in the use of CoQ10 to treat cardiac disease. He conducts his research and clinical practice in Tyler, Texas, and is a long-standing member of our Scientific Advisory Board.

What makes Dr. Langsjoen unique among cardiologists is that he measures his patients’ CoQ10 blood levels to ensure they are absorbing enough of the CoQ10 he prescribes to induce a clinical response.

For healthy older people who are not supplementing with CoQ10, Dr. Langsjoen suggests starting off with 300-400 mg per day for the first month to fully saturate your cells. People can then back down to a daily maintenance dose of 100-200 mg per day to maintain high cellular CoQ10 levels.

Dr. Langsjoen prefers ubiquinol as it absorbs far better into the bloodstream than ubiquinone. For optimal absorption, take your CoQ10 with the heaviest meal of the day as either form of CoQ10 absorbs much better in the presence of a fatty meal.

CoQ10 Wars

Before we published an article about CoQ10 in 1983, Americans had no idea that it was widely used in Japan to treat heart disease.

The FDA reacted to our publication and subsequent sales of coenzyme Q10 with armed raids and threats of substantial jail time. FDA was determined to ban all Americans access to this life-saving nutrient.

Why CoQ10 Initially Confused Cardiologists

Physicians are used to drugs that provide immediate effects.

For instance, if a statin drug (such as Lipitor®) is prescribed, there is almost always a sharp drop in a patient’s LDL cholesterol. Antihypertensive drugs usually provide a quick blood pressure-lowering effect. Anticoagulant drugs (like warfarin) quickly thin a patient’s blood.

These kinds of fast-acting drugs are what doctors and the FDA are accustomed to evaluating.

When CoQ10 came along, it seldom met mainstream medicine’s expectation of a pronounced and immediate effect, especially in patients with congestive heart failure.

So the initial reaction by the mainstream was that CoQ10 had no meaningful clinical benefit.

A study published in December 2014 showed that it takes considerable time (up to two years) for conventional CoQ10 supplements to build up in the heart for significant clinical benefits to occur, such as a 42% reduction in all-cause mortality.4

This is why cardiologist Peter Langsjoen often prescribes high doses (600 mg/day) of ubiquinol to his heart failure patients, as they don’t have the luxury of waiting to build optimal levels of this critical cell energy factor.

We at Life Extension® long ago discovered that low-dose CoQ10 administered to people with chronic disease does not provide needed benefit. The evidence clearly indicated that higher doses of more absorbable forms of CoQ10 are required.
If you enter the terms “coenzyme Q10 and heart failure” into www.pubmed.gov, you can read several hundred published papers that attest to its efficacy.

A majority of cardiologists now recommend CoQ10 to certain patients and it can be widely found on pharmacy store shelves.

We won the battle to keep CoQ10 (and other nutrients) legally available. Most Americans, however, do not know how to optimally use CoQ10, especially as it relates to reversing clinical measures of heart failure.

Readers of Life Extension Magazine®, on the other hand, are kept informed on peer-reviewed published scientific studies that go unreported by the mainstream media.

The information provided in this article should enable many more healthy life-years in those stricken with heart failure.

For longer life,

William Faloon, Co-Founder Life Extension Buyers Club

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In The News

Vitamin D linked to Lower Diabetes Risk

A recently published study examined the possible association between higher levels of plasma 25-hydroxyvitamin D and lower risk of type II diabetes, in view of past reports suggesting this link.*

The researchers focused on a cohort of 903 adults with vitamin D levels at what they described as the high end of normal, above 32 ng/mL, because there had previously been no adequate data in that range.

The subjects were free of diabetes or prediabetes from 1997 to 1999 during testing at the National Institutes of Health Lipid Research Centers clinic. Over subsequent years, through 2009, subjects were tested for fasting plasma glucose and oral glucose tolerance, as well as vitamin D levels.

Ultimately, there were 47 diabetes cases and 337 cases of prediabetes. Compared to levels of vitamin D below 30 ng/mL, subjects with higher vitamin D blood levels had a lower risk of developing type II diabetes.

Those with the highest vitamin D levels, above 50 ng/mL, had the lowest risk. This is the blood level (over 50 ng/mL) typically seen in people who supplement with 3,000 IU to 8,000 IU a day of vitamin D3 with a meal containing some fat.

Editor’s Note: This study tested for an association between vitamin D and lower diabetes risk, but did not establish a causal relationship. The researchers encourage further study to determine if high doses of vitamin D might prevent type II diabetes or the transition of prediabetes to diabetes.

In The News

Zinc May Inhibit Esophageal Cancer Growth

A promising avenue for preventing or treating esophageal cancer is suggested by a recent study that shows zinc can impede progression of the disease.*

While a link between zinc deficiency and esophageal cancer had already been noted in previous studies, the mechanism underlying the mineral’s apparent anticancer effects was previously unknown.

The study, led by Zui Pan of the College of Nursing and Health Innovation at the University of Texas at Arlington, found that zinc inhibits the growth and proliferation of esophageal cancer cells by blocking a particular calcium channel that is known to contribute to cancer growth.

Zinc was not found to have the same effect on healthy cell lines.

Compared to other types of cancer, the prognosis for esophageal cancer is generally poor, with a five-year survival rate for only 20% of cases. Pan and fellow researchers are optimistic that zinc supplementation could be a viable approach for prevention and/or treatment of the disease.

Editor's Note: Study leader Zui Pan remarks: “Our study, for the first time to our knowledge, reveals that zinc impedes overactive calcium signals in cancer cells, which is absent in normal cells, and thus zinc selectively inhibits cancer cell growth.”

Those being treated for esophageal cancer should ensure they are obtaining 25-50 mg of zinc each day.

Soy, Vegetables Could Reduce Cancer Treatment Side Effects

An article appearing in *Breast Cancer Research and Treatment* reported an association between greater consumption of soy foods and cruciferous vegetables and a lower risk of experiencing side effects from breast-cancer therapy.*

The study included 173 non-Hispanic Caucasian and 192 Chinese-American breast-cancer survivors. Dietary intake data was obtained from responses to mailed questionnaires. Telephone interviews obtained information concerning treatment-related symptoms, including joint problems, fatigue, hair loss or thinning, memory problems and menopausal symptoms.

Consuming 24 grams per day or more of soy was associated with a 49% lower risk of experiencing menopausal symptoms and a 57% lower risk of fatigue compared to no soy.

In comparison with subjects whose intake of cruciferous vegetables was less than 33 grams per day, consuming 70.8 grams or more was associated with half the risk of menopausal symptoms. The associations were significant for Caucasian breast-cancer survivors.

**Editor’s Note:** It was suggested that isoflavones occurring in soy and glucosinolates in cruciferous vegetables could be responsible for the reduction in symptoms observed in the study.

CoQ10 Benefits Diabetic Patients

A trial reported in the *Journal of the American College of Nutrition* found improvement in glucose metabolism as well as a decrease in oxidative stress and advanced glycation end products (AGEs) among individuals with diabetic nephropathy (kidney damage caused by diabetes) who received coenzyme Q10 (CoQ10) compared to those who received a placebo.*

The trial included 50 participants with diabetic nephropathy who, for 12 weeks, received either 100 mg of CoQ10 per day or a placebo. Blood samples collected before and after the treatment period were analyzed for insulin, hemoglobin A1c, plasma malondialdehyde (MDA, a marker of lipid peroxidation) and AGEs.

At the end of the trial, participants who received CoQ10 had lower serum insulin, less insulin resistance, less oxidative stress, and lower levels of AGEs compared to levels measured before treatment, while the placebo group failed to experience improvements in these factors.

*Editor’s Note: AGEs are proteins or fats that become glycated during exposure to glucose, which can damage tissue.

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Mega Green Tea Extract Lightly Caffeinated
Item #00953 • 100 vegetarian capsules

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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.

References

For full product description and to order Mega Green Tea Extract, call 1-800-544-4440 or visit www.LifeExtension.com

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People are surprised to learn that about 70% of the human immune system resides in the gut (known as the gut microbiome).

The immune system relies on the presence of healthy intestinal bacteria to protect the body from illness.1,2

Age, poor diet, medications, and stress can upset the delicate balance of good to bad bacteria.3

An imbalanced gut microbiome contributes to autoimmune disorders, metabolic syndrome, diabetes, chronic fatigue, nonalcoholic fatty liver disease, obesity, and more.4-12

Life Extension® readers understand the value of taking a quality probiotic to help balance the microbiome and strengthen the immune system.

Incorporating bacteriophages with a probiotic takes this intestinal health strategy a step further.

Bacteriophages selectively target specific, harmful bacteria while leaving beneficial microbes to flourish. This was pioneered in Europe before the advent of antibiotics.13-15

Bacteriophages are especially beneficial when used in conjunction with probiotics because they act like advanced troops to clear the way for beneficial bacteria to flourish.

Laboratory studies show that when probiotics and phages are used in combination, beneficial bacteria grow to thousands of times their baseline rate.16,17
Bacteriophages are submicroscopic packages of DNA or RNA enclosed in a protein envelope, and each one is chosen for its ability to attach to a unique strain of unwanted bacteria in the intestines. In other words, they selectively target specific, harmful bacteria, while leaving beneficial microbes to flourish.

The Long History of Phage Therapy

Using phages to control bacterial illnesses was pioneered in Eastern Europe before World War I.13-15 By the 1940s, industrial giants such as Eli Lily and L’Oréal had developed bacteriophage “cocktails” for treating infections, but the advent of antibiotics quickly stole the spotlight (even though the effectiveness of phages was never in question).22

We’ve come to recognize that one of the key drawbacks to antibiotics is that they employ a mass-killing technique that eliminates both detrimental and healthy bacteria, leaving us vulnerable to attack by other organisms.28 In direct contrast to antibiotics, bacteriophages specifically eliminate only the detrimental bacteria while leaving healthy bacteria untouched.

Because of these targeted actions, the food industry now uses bacteriophages to control disease-causing organisms.29-31 Many of these phages are classified by the FDA as GRAS (generally recognized as safe) and are commonly used for controlling bacteria ranging from Listeria in cheese and E. coli in meat, to E. coli on food-contact surfaces, to Salmonella in food.
indicating their inability to compete with *E. coli*. But in the dishes containing the bacteriophages, colonies of *B. longum* skyrocketed to more than 7,000 times their numbers compared to petri dishes without the bacteriophage. This was a clear demonstration of how the bacteriophage selectively targeted the *E. coli*, making room for the beneficial bacteria to multiply.16

In a similar study, the beneficial bacteria *Lactobacillus acidophilus* was grown along with *E. coli*. As expected, the *E. coli* greatly suppressed growth of the *L. acidophilus*. But when the phage cocktail was added, *L. acidophilus* thrived, reaching colony counts that were 20-fold higher compared to the culture not receiving the bacteriophages. Similar results were observed when beneficial *B. bifidum* bacteria were tested.16

Switching gears, scientists tested the capacity of the common prebiotic *inulin* to stimulate the growth of the beneficial *Lactobacillus paracasei*. Used alone, inulin failed to ensure the survival of the desired organisms. But using the combination of inulin plus the phage mixture produced an astonishing nine million-fold increase in the growth of the beneficial *L. paracasei*.16

These initial lab findings demonstrated the value of the phage mixture in promoting the growth and survival of beneficial organisms. Now it was time for scientists to test its potency in live subjects.

A phage cocktail is effective within hours, not days, and in very small doses.16 As an added benefit, it functions not only in the large intestine, where bacterial imbalance (dysbiosis) is a problem, but also in the small intestine, where undesirable bacterial overgrowth can occur.

Animal studies have validated the benefits of using probiotics and phage therapy together. For example, when combined with a probiotic in an animal model, there was an exponential increase in beneficial bacteria with a parallel decrease in unfriendly flora such as *E. coli*.32-34

Let’s examine more of the remarkable findings on this novel therapy.

**Bacteriophage Potency**

Scientists established the efficacy of bacteriophages in promoting healthy bacteria in a series of lab experiments.

In the first study, culture dishes were prepared with a beneficial bacterium (*Bifidobacterium longum*) along with competitive *E. coli* bacteria. *E. coli* can be found in our gut, and although most strains are harmless, some can cause disease, and they can crowd out beneficial organisms.

Scientists in this study also prepared an identical set of dishes except for the addition of a bacteriophage mixture. After just five hours, the difference was striking.16

In the dishes without the bacteriophages, there was little growth of the desirable *B. longum* organism, indicating their inability to compete with *E. coli*. But in the dishes containing the bacteriophages, colonies of *B. longum* skyrocketed to more than 7,000 times their numbers compared to petri dishes without the bacteriophage. This was a clear demonstration of how the bacteriophage selectively targeted the *E. coli*, making room for the beneficial bacteria to multiply.16

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**What You Need to Know**

**Using Phage Therapy to Boost Probiotics**

- Supplementation with potent probiotics is essential to supporting health throughout the body.
- Now, safe bacteriophages are available that selectively kill off undesirable bacteria, making room for beneficial bacteria to grow.
- Studies show that taking probiotics with targeted phages removes competing, unhealthy microbes to allow the beneficial probiotics to attain huge numbers.
- This approach can powerfully optimize digestive health and overall wellness by balancing the digestive tract microbiome.
Phage Cocktail Validated in Gastrointestinal Environment

Researchers next demonstrated the effectiveness—and safety—of a phage cocktail when used in the gut of living lab rodents. One group of mice was given the probiotic B. longum along with the disease-causing E. coli strain H10407. The second group received the same mixture but with the addition of a phage cocktail specifically designed to target E. coli.

After just 24 hours, the phage-treated group experienced a clear reduction in E. coli along with an impressive increase in beneficial B. longum bacteria.

The phage group showed the following effects on E. coli:

- 10-fold decrease of E. coli in the small intestine;
- 100-fold decrease of E. coli in the large intestine;
- 100-fold decrease of E. coli in fecal matter.

The phage subjects showed the following approximate effects for B. longum:

- 100-fold increase of B. longum in the small intestine;
- 100-fold increase of B. longum in the large intestine;
- 40-fold increase of B. longum in fecal matter.

The phage-treated group had improved digestive function and no detrimental changes, establishing overall safety and benefit.

By contrast, mice treated with only E. coli and B. longum—without the added phage cocktail—became constipated with intestinal segments showing swelling, redness, and leaks compared with healthy animals.

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

Summary

Our gut microbiome greatly affects your immune system and overall health.

Probiotics have become popular to help balance intestinal flora.

Taking bacteriophages along with a probiotic selectively kills undesirable bacteria, making way for the good bacteria to survive and thrive.

When probiotics are accompanied by targeted phage therapy, beneficial bacteria multiply massively thanks to the removal of competing, unhealthy microbes.

Phage therapy shows promise in relieving the functional changes caused by gut microbiome imbalance. These may be especially valuable for aging individuals.

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

Proven Safety Record

Bacteriophages have been successfully used in numerous human clinical and therapeutic settings and have demonstrated an extremely strong safety profile. The reason for the very safe interaction between phages and human tissue likely results from human exposure to vast numbers of phages over the entire course of evolution. This naturally high human tolerance to bacteriophages contrasts sharply with the risks inherent in compounds that are relatively novel in human evolution—such as drugs.
**References**


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

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- T4D - Myoviridae
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Scientists have uncovered further evidence about the abilities of PQQ (pyrroloquinoline quinone) to help support the brain.

Generating excitement are three distinct ways that PQQ reduces brain aging including:

- Improved **brain blood flow**
- Reduced **neurotoxicity**
- Protection against **sugar** damage

A study published in 2017 demonstrates that a formulation containing PQQ reduced evidence of **Alzheimer’s disease** in the laboratory animal model.
This was evidenced by raised levels of ATP (energy) and oxygen utilization, and less oxidative stress, which damages mitochondria.4

Overall, this study shows that PQQ, along with other ingredients, may contribute to beneficial effects on motor and cognitive function, largely through improving mitochondrial function and reducing toxic proteins in the brain.4

These findings add considerably to previous work done with a mouse model of Parkinson's disease. In this study, PQQ restored mitochondrial function in damaged brain cells and prevented brain-cell loss—effects that reduced the abnormal movements associated with Parkinson's.5

There's also evidence that PQQ can prevent glutamate-induced neurotoxicity in brain cells in culture, helping to quell the storm of chemical stresses that such “excitotoxicity” produces.3,6

Together, these studies highlight PQQ’s ability to interfere with brain cell toxicity and restore normal function.

How PQQ Powers Better Brain Function

The human brain uses more energy than any other organ in the body.

We devote 20%-25% of all energy to supporting brain function.9

This energy production is powered by mitochondria, the energy factories that convert food into the cellular fuel that powers our entire body.9

With age, some mitochondria tend to die off, and the ones that are left don’t function as well.10 This results in an energy crisis that can have a devastating impact on brain function.

PQQ has been shown to reduce brain aging by helping existing mitochondria work more efficiently—and to promote the formation of new mitochondria.

Neurotoxicity Damages the Brain

Brain cells are damaged by chronic exposure to toxins, even at low doses.

Some toxins come from outside the body. For example, heavy metals, bacterial toxins, and environmental poisonings are all possible factors in neurodegenerative diseases like Parkinson's.11-14

Other brain-damaging toxins form within the body. These include the abnormal proteins (like tau and beta-amyloid) that accumulate in brain tissue and contribute to the destruction of brain cells in senile disorders.4,15,16 The neurotransmitter glutamate is known to cause excitotoxic damage to brain cells with aging.3,16,17

A 2017 animal study has now demonstrated that PQQ can help prevent the neurotoxicity that is so damaging to the brain.

Protecting Against Senile Pathologies

In a mouse model of Alzheimer’s disease, mice were given a formulation containing PQQ and other ingredients (green tea, blueberry powder and extract, carnosine, vitamin D, and grapeseed extract) for 12 weeks. The researchers then compared their behavioral and neurological progress with similar, but unsupplemented, animals.4

The supplemented mice experienced benefits over their unsupplemented counterparts, including reduced motor deficits and reduced cognitive impairment. They also learned significantly faster and had better recall.4

When the researchers examined the mice's brains, they found significantly smaller deposits of toxic proteins in the brains of the supplemented animals indicative of protection against neurotoxicity.4

There were also compelling indications of improved mitochondrial efficiency in the supplemented mice.
PQQ Protects Brain Tissue From Sugar Damage

People with type II diabetes have an increased risk of developing Alzheimer’s disease. The connection is so strong that many scientists now refer to Alzheimer’s as “type III diabetes.”

This is partly because chemical activity associated with increased glucose levels has now been directly tied to the formation of the toxic tau and beta-amyloid proteins associated with Alzheimer’s and other neurodegenerative diseases.

PQQ Restores Brain Blood Flow

Because of the brain’s constant energy requirements, it demands a substantial share of blood.

However, as we age, conditions like atherosclerosis, endothelial dysfunction, and other blood-vessel changes blunt blood flow to the brain. This can affect cognitive function, while leaving us vulnerable to acute loss of blood flow, which can result in a stroke.

Two human studies published in 2016 demonstrate that supplementing with PQQ has beneficial effects on brain blood flow and cognitive function.

In one randomized, placebo-controlled clinical trial, 41 healthy elderly subjects took 20 mg of PQQ/day or a placebo. Then they were tested for both cognitive function and brain blood flow using sophisticated near-infrared spectrometry.

After 12 weeks, the people taking PQQ experienced improvements in their working memory and in their ability to retain focus on tasks in the face of distractions. These benefits were likely produced by a PQQ-induced increase in brain blood flow to the relevant parts of the brain.

A follow-up study demonstrated that taking 20 mg of PQQ every day for 12 weeks boosted blood flow to the right prefrontal cortex. This is the area of the brain devoted to higher cognitive functions.

In addition, oxygen utilization in that area was significantly higher in supplemented people, a clear demonstration that PQQ was boosting energy extraction to fuel the improved cognitive performance.

These studies highlight the importance of PQQ in improving brain blood flow as an important step in slowing cognitive decline with aging.

PQQ Reduces Brain Aging

- Cognitive decline and dementia take a lifetime to develop, but can rob an individual of a lifetime of memories in just a few years.
- Many different processes contribute to cognitive decline, most of which are preventable if addressed far enough in advance.
- PQQ is showing tremendous promise at fighting age-related brain dysfunction.
- Studies show that PQQ acts on at least three different dementia-producing processes: neurotoxicity, declining brain blood flow, and glucose-induced vascular damage.
- Many of these beneficial effects can be traced back to PQQ’s ability to boost mitochondria, the cell’s energy factories that are particularly important for healthy brain function.
- Taking 20 mg of PQQ is recommended for keeping these cognition-threatening processes at bay and slowing the age-related decline in cognitive function.

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People with type II diabetes have an increased risk of developing Alzheimer’s disease. The connection is so strong that many scientists now refer to Alzheimer’s as “type III diabetes.”

This is partly because chemical activity associated with increased glucose levels has now been directly tied to the formation of the toxic tau and beta-amyloid proteins associated with Alzheimer’s and other neurodegenerative diseases.
But sugar-induced damage takes place in many people, which means that non-diabetic individuals are at risk for neurodegeneration related to the harmful effects of chronic glucose exposure.18,19

One of the most destructive effects of sugar on brain function is its impact on brain blood vessels. Long-term glucose exposure damages cells in the vessel lining (the endothelial layer) that are responsible for modulating blood flow and pressure.20,21

A recent study has indicated that PQQ may protect against glucose-induced endothelial dysfunction in the brain.7

To determine this, researchers treated cultured brain endothelial cells with concentrated sugar solutions, which reduced the cells’ ability to survive. Sugar exposure caused many cells to undergo programmed cell death (apoptosis), while raising the levels of reactive chemical stressors within cells.7 This is critical because the loss of brain cells plays a role in neurodegenerative diseases.22,23

When PQQ was added to these sugar-laden endothelial cell cultures, there was:

- Reversal of cell damage
- Prevention of apoptosis
- Reduced formation of chemical stressors

Most of these beneficial effects could be traced to improvements in the function, and even the number, of mitochondria within endothelial cells.7

It is already known that PQQ can boost the production of new energy-producing mitochondria (this is called mitochondrial biogenesis). This study advances our knowledge of PQQ in this arena, and shows that such protection affords insurance against the sugar-induced vessel damage that can contribute to declining brain function.

Summary

PQQ is emerging as an important brain-protective nutrient. Studies now show that PQQ can protect brain tissue against toxic assault (neurotoxicity) from inside and outside the body.

PQQ boosts brain blood flow, in a direct counterattack on blood flow restrictions imposed by aging blood vessels.

PQQ can also limit the glucose-induced damage to brain blood vessels, a major contributor to dementia and other forms of cognitive decline.

Supplementing with 20 mg of PQQ is recommended for keeping these cognition-threatening processes at bay and slowing age-related decline in cognitive function.●

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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These plant extracts help maintain healthy after-meal blood glucose levels and insulin response, and promote healthy HbA1c levels.
PQQ (pyrroloquinoline quinone) activates genes involved in the production of cellular energy.\(^1\)\(^5\)

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In fact, just 20 mg per day of PQQ plus CoQ10 promotes memory and attention in aging individuals.\(^8\)

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References

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Blueberries provide health-boosting benefits shown to:

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Blueberry Extract Capsules
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Blueberry extract is more potent than the whole berry, providing greater metabolic support throughout the body and without the excess sugar of raw fruit.

Suggested dose is one capsule daily for most individuals.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Milk thistle extract—rich in silymarin—is a powerful weapon to support liver health. Scientific studies demonstrate silymarin’s ability to provide potent protection for your liver. 

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

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

**European Milk Thistle**

**Advanced Phospholipid Delivery**

Item #01922 • 60 Softgels

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For full product description and to order, call 1-800-544-4440 or visit www.LifeExtension.com

**References**

Benefits of Immediate- and Extended-Release MELATONIN
Many people have trouble falling and staying asleep, and sleep interruptions worsen with age.

A mouse study published in 2017 showed that lack of sleep can cause parts of synapses—the connections between brain cells—to break down, leading to cognitive issues.¹

**Insufficient sleep** is linked to diabetes, hypertension, heart attack, shortened telomeres, and premature death.²⁻⁵

In 1992, Life Extension® introduced melatonin as an alternative to sleep medications. It has benefited many people who suffer from insomnia, but not all forms of sleep problems respond to melatonin.

For individuals who continue to have sleep issues, a micronized melatonin provides immediate release and extended release to help fall and stay asleep.
Immediate-release melatonin can help one get to sleep faster and experience more restful and regenerative sleep.

For others, insufficient melatonin release throughout the night may result in difficulty staying asleep or difficulty getting back to sleep after awakening in the night. For these individuals, extended-release melatonin may support a full night of uninterrupted sleep.

Using micronized melatonin and a proprietary encapsulation technology, a new melatonin formula gradually delivers precise amounts of melatonin over a period of 7 hours. In a double-blind, crossover study involving 12 elderly subjects who had complained of insomnia, participants took extended-release melatonin for three weeks. After a washout period, they then took a placebo for three weeks. The study authors concluded that:

“Controlled-release melatonin replacement therapy effectively improves sleep quality in this [elderly] population.”

Many practitioners recommend starting with a low dosage of melatonin. Once one knows how one's body reacts to it, the dosage can be increased to suit the individual's needs. The total dose of a new dual-action formula is 1.5 mg, comprised of:

- 0.75 mg of immediate-release melatonin
- 0.75 mg of extended-release melatonin.

Since everyone's biochemistry and sleep patterns are different, it may take trial and error before the ideal dosage and supplement formulation is found, i.e. immediate, extended, liquid, or immediate/extended-release.

Wide-Ranging Health Risks of Poor Sleep

The effects of sleep inadequacy go far beyond simple fatigue or reduced endurance. They include:

- Decreased feeling of fullness, increased hunger and food consumption, weight gain, and a higher risk of obesity.
- Increased fine lines and wrinkles.
- A shortening of telomeres (the chromosome “caps” that shorten with time and may serve as an indicator of aging).
- Enhanced susceptibility to stress and anxiety, which disrupts circadian rhythms, leading to poor sleep and (in a typical vicious cycle) more stress.
Neuroprotective Effect of Melatonin

Melatonin has been shown to protect the brain against oxidative stress and the neurodegeneration that occurs as a result of aging.26

In addition, scientists are finding that the age-related decline in melatonin levels may be a critical factor in the age-related increase in neurodegenerative diseases.6,11,27

Numerous animal studies have shown the brain-protective effects of melatonin, including: shrinking the size of the infarct, or damaged area, after a stroke, guarding against Alzheimer’s disease and Parkinson’s, and improving blood-brain barrier impairment and swelling after a brain injury.28-35

The blood-brain barrier is essential to neural function. Damage to it is considered an early event in the process of various neurological diseases.36

Melatonin has been shown to preserve the integrity and permeability of the blood-brain barrier in old mice.37 This study led a group of researchers to suggest that “melatonin supplementation may help prevent neurological diseases through maintaining the integrity of [the blood-brain barrier] in old people.”36

What You Need to Know

Melatonin Enhances Sleep Quality

- Inadequate sleep duration and quality might be caused by an age-related decline in melatonin levels.
- Prescription sleeping pills come with extensive side effects, addiction potential, and a higher risk of premature mortality.
- Melatonin supplementation has been clinically demonstrated to improve sleep onset, duration, and quality.
- For those who have difficulty staying asleep, extended-release melatonin can deliver a full night’s sleep without interruptions.
- A new micronized melatonin is specially formulated to release 0.75 mg of melatonin immediately to help one fall asleep fast, and another 0.75 mg of melatonin over the next seven hours to help one stay asleep.
Do You Have Trouble Staying Asleep?

The secretion of melatonin declines with age, which can interfere with your ability to get to sleep. Supplementing with melatonin helps keep your circadian rhythm in tune.

- The immediate-release form of melatonin can help initiate sleep faster and induce more restful and regenerative sleep.
- For some people, the liquid form of melatonin achieves adequate results.
- But for others, reduced levels of melatonin at night may result in difficulty staying asleep or difficulty getting back to sleep after awakening in the night. For these individuals, extended-release melatonin supplements support a full night of uninterrupted sleep.
- A novel immediate/extended-release (IR/XR) melatonin supplement combines an immediate burst of melatonin to help initiate sleep—along with an extended-release dose to keep melatonin levels from falling during the night and to help one sleep. The total dose of this dual-action product is 1.5 mg, comprised of 0.75 mg of immediate-release melatonin and 0.75 mg of extended-release melatonin. It is best to take one to two 1.5 mg capsules, 30-120 minutes before desired sleep onset.

Since everyone’s biochemistry and sleep patterns are different, it may take some trial and error before one finds the ideal dosage and supplement formulation—immediate, extended, liquid, or immediate/extended-release—to match individual body rhythm and sleep needs.

Migraine is a neurological disease which can dramatically impact quality of life. In a recent review of the literature, melatonin supplementation was found to be effective in preventing migraines and was superior to placebo in preventing cluster headaches. Melatonin may also play a role in preventing tension headaches.38

Summary

Inadequate sleep is associated with an increased risk of obesity, diabetes, cognitive decline, and stroke, shortened telomeres, and premature death.2-5

Prescription sleeping pills come with side effects, addiction risk, and increased risk of premature mortality.

Supplementation with melatonin is clinically shown in some studies to enhance onset, duration, and quality of sleep, but does not work for every kind of sleep problem.39-41

A unique form of micronized melatonin has been developed that provides immediate release and extended release to help one fall asleep and stay asleep.●

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

Excessive daytime sleepiness in elderly adults with normal cognitive function has been shown in a new study to be linked with the buildup of beta-amyloid in the brain.42

The implications are cause for real concern, since the accumulation of beta-amyloid is a precursor to the development of Alzheimer's disease. This buildup begins before symptoms are apparent.

The study conducted by the Mayo Clinic included 283 subjects, average age of 77. Over a period of two years, the subjects' brains were measured for levels of beta-amyloid, and they regularly reported the amount of daytime sleepiness they experienced. Results showed that subjects who developed the highest amounts of beta-amyloid were also the ones who reported the most daytime drowsiness. The amyloid levels were particularly high in brain areas associated with memory, behavior, and emotion.

The researchers say their study is the first to specifically show that excessive daytime sleepiness in cognitively normal elderly people leads to a buildup of amyloid in the brain.

“We know that sleep is necessary to clear toxins and beta-amyloid in the brain,” said study author Prashanthi Vemuri. “We also know that beta-amyloid causes sleep disruptions. So it’s been a chicken-and-an-egg problem.”43

Dr. Richard Isaacson, director of the Alzheimer’s Prevention Clinic at Weill Cornell Medicine and NewYork-Presbyterian was impressed with the study. “In fact,” he said, “the findings will change the way I care for patients, as I will now proactively ask about excessive daytime sleepiness as one of many potentially modifiable risk factors for the disease.”43

References


“D”-fend Your Health

VITAMIN D3
Systemic Support for Youthful Cell Function, bone health, and supporting normal insulin and blood-sugar levels.

For full product description and to order Vitamin D3, call 1-800-544-4440 or visit www.LifeExtension.com

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

Item # 01713 • 5,000 IU • 60 softgels

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
MacuGuard® Ocular Support provides lutein, *trans*-zeaxanthin, and *meso*-zeaxanthin to help maintain structural integrity of the macula and retina.\(^1\)\(^5\)

**Alpha-carotene** is included based on new evidence that it helps support the macular pigment.\(^1\)

People supplementing with **saffron** showed an improvement in **vision** as measured by them seeing an average of **two additional lines** on the eye chart commonly used by doctors to test vision.\(^1\)

This formula provides the optimal **dose** of **saffron** along with **cyanidin-3-glucoside** to support healthy vision.\(^6\)\(^8\)

**MacuGuard® Ocular Support with Saffron**

Item #01992 - 60 softgels

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Each bottle lasts for **two months**.

References
With age, the body’s nocturnal peak of melatonin declines, making it harder to fall asleep and stay asleep.

Melatonin IR/XR is composed of two delivery forms of melatonin.

- Immediate-release melatonin helps you get to sleep.*
- Extended-release helps you stay asleep.*

Take Melatonin IR/XR at night for better bedtimes.

For full product description and to order Melatonin IR/XR, call 1-800-544-4440 or visit www.LifeExtension.com

* For occasional sleeplessness

MicroActive® Melatonin is a registered trademark of Bioactives LLC.

Melatonin does not resolve all types of sleep problems. Do not consume alcohol, drive, or operate machinery after taking this product. Keep out of reach of children. Do not exceed recommended dose. Please consult with your physician if you are undergoing treatment for a medical condition or if you are pregnant or lactating.
DHEA is one of the most important hormones in your body. It supports immune function, mood, sex drive, and lean muscle mass.

DHEA levels markedly decline with age.

Because everyone’s needs are different, Life Extension® offers DHEA in different encapsulated potencies, along with a dissolve-in-the-mouth tablet.

DHEA 15 mg capsules

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Item #00454 • 100 capsules

DHEA 25 mg capsules

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Item #00335 • 100 capsules

DHEA 25 mg tablets

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Item #00607 • 100 dissolve-in-mouth tablets

DHEA 50 mg capsules

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Item #00882 • 60 capsules

Caution: Consult a physician or licensed, qualified healthcare professional before using these products if you have, or have a family history of, breast cancer, prostate cancer, or other hormone-sensitive diseases.

For full product description and to order DHEA, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
The plant compounds in AMPK Metabolic Activator help boost AMPK, a cell enzyme that mitigates mechanisms of aging and promotes vascular function while helping reduce belly fat.

For full product description and to order AMPK Metabolic Activator, call 1-800-544-4440 or visit www.LifeExtension.com

ActivAMP® is a registered trademark of Gencor.
This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results may vary and are not guaranteed.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
How Plant Extracts Can Protect Against Photoaging and Skin Cancer
Nothing ages your skin faster than sun exposure. Everyday exposure to the sun’s ultraviolet rays causes cumulative DNA damage that leads to photoaging and increases the risk of skin cancer.\(^1\)

Sunscreens help considerably, but they aren’t able to provide total protection.

An extract of a Central American fern plant called *Polypodium leucotomos*, when orally ingested, helps keep ultraviolet rays from damaging your skin and increasing cancer risk. This plant extract protects skin cells from the inside out!

Two additional compounds—red orange extract and nicotinamide—provide additional protection from photoaging and DNA mutation.

Ideally, this “oral sunscreen” should be used alongside a high-SPF topical sunscreen. This unique oral botanical can provide all-day protection.
Sun Exposure Destroys Skin Cells

While most people love the warm glow of sunlight on their skin, these rays are quite damaging. The sun’s ultraviolet (UV) light damages skin DNA, suppresses a vital tumor-suppressor gene, and inhibits immune cells.1,6

If left unchecked, this onslaught causes skin to age faster and boosts the risk of skin cancer.

Wearing sunscreen is important, but it doesn’t provide total protection. It doesn’t protect the scalp or eyelids, it may be rubbed off by perspiration or swimming, and most people don’t use nearly enough to block the sun’s rays. Although clothing is a good means of sun protection, UV rays can still penetrate some fabrics.7

A plant extract called Polypodium leucotomos offers an ideal complement to topical sunscreens. Because it is taken orally, it protects all skin areas evenly—and it won’t wash or rub off.

Unlike sunscreens applied to the skin, Polypodium leucotomos extract is rich in polyphenols that inhibit oxidative stress and inflammation—while also protecting skin cells against DNA damage caused by ultraviolet radiation.8

Blocking Sun-Damage Mechanisms

Ultraviolet radiation causes photoaging and skin cancer because of how it impacts your DNA. This occurs through three mechanisms in particular:9-11

• First, UV radiation causes initial DNA damage.
• Second, it stops damaged DNA from being removed.
• Third, it prevents damaged DNA from being repaired.

Scientists found that orally administered Polypodium leucotomos protected hairless mice that were exposed to UV radiation by inhibiting all three of these UV-damage mechanisms.12

It also helped combat inflammation of the skin. Impressively, this study showed that Polypodium leucotomos helped reduce DNA damage during—and even before—UV exposure.12

Anti-Aging Effects

Researchers conducted lab studies on skin cells to investigate the extract’s general anti-aging effects on skin elasticity and structure. They found that Polypodium leucotomos was able to:

• Inhibit enzymes that break down the elastin and collagen required for youthful-looking skin,13,14 and
• Protect cells that make the structural framework of skin tissue (the extracellular matrix and collagen).13

In other words, Polypodium leucotomos prevented the key underlying mechanisms involved in skin aging.

Human Clinical Trial

In a human study, healthy volunteers between 29 and 54 years old took 480 mg of Polypodium leucotomos extract orally prior to being exposed to UV rays. Skin biopsies showed decreases in DNA damage—suggesting photoprotective effects on DNA.15

When subjected to a low dose of UV light, placebo participants had a 217% increase in damaging DNA mutations, while Polypodium-supplemented participants had a striking 84% decrease.15

Such DNA mutations and formation of damaging DNA photoproducts are the main cause of prematurely aged skin and skin cancer.11,16-19
When subjected to higher UV exposure, DNA mutations in the placebo group increased by 760%. By contrast, these mutations increased by only 61% in the Polypodium-supplemented group.15

These studies show that orally taken Polypodium leucotomos helps prevent an array of mechanisms involved in UV light-induced skin-cell damage.

Additional UV Protection

UV radiation reduces the production of ATP (adenosine triphosphate), the cellular energy which the body needs to repair damaged DNA.20

For additional help in this area, we turn to a form of vitamin B3 called nicotinamide. Nicotinamide helps prevent UV-induced loss of cellular ATP. Protecting ATP (adenosine-triphosphate) helps promote continuous DNA repair mechanisms.20

In one study, scientists pretreated skin cells with nicotinamide and then exposed them to UV radiation. The nicotinamide removed and replaced damaged DNA and significantly increased the number of cells undergoing DNA repair. It also reduced the production of damaging DNA photoproducts in cell cultures and in human skin.21

In addition, a clinical trial showed that nicotinamide can also protect against UV-induced immune suppression.2

These two actions—repairing DNA and protecting against immune suppression—contribute to nicotinamide’s ability to reduce the risk of skin cancer.3

Nicotinamide’s protective effects against cancer were seen in a clinical study of 386 healthy patients who had been diagnosed with at least two non-melanoma skin cancers in the previous five years. This put them in the “high-risk” category for future skin cancers.

The participants took 500 mg doses of nicotinamide or placebo twice a day. After 12 months, the rate of new non-melanoma skin cancers in the supplemented group was reduced overall by 23% compared to the controls.22
A Third Pillar of Sun Defense

Red orange extract is a complement to *Polypodium leucotomos* because it provides protection against UV-induced inflammation and oxidative stress.

Red orange extract is obtained by a patented process from three pigmented varieties of *Citrus sinensis*. Its UV-protection benefits are due to its abundant anthocyanins, flavanones, and hydroxycinnamic acids.21-23

In a human study, oral supplementation with red orange extract reduced sunburn intensity by 35%.27 The number of lifetime sunburns is closely correlated with the development of skin cancers.28

In another study, researchers applied red orange extract to skin cells and then exposed them to UV radiation. The extract significantly reduced UV-induced cell damage, inflammation, and cell death.24

Summary

Everyday exposure to the ultraviolet rays of the sun causes cumulative DNA damage that massively accelerates photoaging of the skin and increases the risk of skin cancer.

Research shows that—taken orally—a fern extract called *Polypodium leucotomos* has protective effects against UV-induced damage to skin cells and supports DNA repair—two key mechanisms that lower cancer risk and help prevent premature skin aging.

Adding nicotinamide and red orange extract provides an even greater level of sun protection.

These nutrients can be taken orally to provide a baseline of protection against the sun’s damaging effects and to complement topical sunscreens by protecting even hard-to-reach areas of the body.

They offer evenly distributed skin protection *from the inside*, and won’t rub or wash off.

For prolonged exposure to UV radiation, this potent defense should be combined with a high-quality, high-SPF topical sunscreen for more complete protection.

How the Sun Damages Skin

Exposure to ultraviolet radiation starts a chain reaction of events that ends in either prematurely aged skin, skin cancer, or both.

1. First, UV radiation causes DNA damage. It triggers photochemical reactions that produce compounds known as DNA photoproducts.19 Photoproducts can then trigger DNA mutations, the main cause of prematurely aged skin and skin cancer.16-19

2. UV radiation prevents the natural DNA repair of damaged cells. The photoproducts generated by the sun’s rays alter a gene called p53. This vital tumor-suppressor gene is known as “the guardian of the genome.”4-6

   When DNA damage occurs, p53 activates DNA repair. If the damage to the DNA is irreparable, p53 initiates programmed cell-death (apoptosis) to eliminate the damaged cell.4,29 But when the p53 gene is mutated by UV light, it can no longer do its job. As a result, damaged cells do not undergo normal DNA repair, they escape apoptosis, and they start to multiply.30

   It’s not surprising, then, that p53 is one of the most frequently mutated genes in human cancers.4

3. UV radiation inhibits the production of valuable ATP (adenosine triphosphate).16,20 Without adequate ATP levels, the body’s repair systems cannot remove damaged DNA segments.31,32 Damaged cells can then continue to multiply.

   These mechanisms result in ultraviolet radiation being the main cause of skin photoaging, as well as the main cause of skin cancer.11

   Orally taken *Polypodium leucotomos* combats UV radiation by promoting both DNA protection and repair.12,15
References

Revive Worn-out Hair, Skin, and Nails from Within

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

- **VERISOL® Bioactive Collagen Peptides®**—Stimulates the formation of new collagen and elastin to promote skin suppleness and elasticity

- **Cynatine® HNS Plus**—Provides solubilized keratin, zinc, B vitamins, biotin, and copper to boost production of keratin for strong hair, skin, and nails

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

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

For full product description and to order Hair, Skin & Nails Rejuvenation Formula with VERISOL®, call 1-800-544-4440 or visit www.LifeExtension.com

References

Caution: Individuals with in-born errors of copper metabolism (e.g. Wilson's disease) should avoid daily, chronic use of this product.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Enjoy the Outdoors with
Broad-Spectrum Shade Factor™ Sun Protection

Shade Factor™ Mineral Sunscreen Lotion contains sunscreen agents to block damaging UV rays AND botanical ingredients to help reduce early skin aging. Its unique formula makes it a great choice for those seeking a broad-spectrum paraben-free lotion.

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Shade Factor™ Sunscreen Spray is transparent on the skin and easy to apply. It provides broad-spectrum UV protection along with botanical ingredients in a cooling mist.

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Item #02118 • 6 oz. spray bottle

For full product description and to order Shade Factor™ Lotion or Spray, call 1-800-544-4440 or visit www.LifeExtension.com
SHIELD YOUR PRECIOUS EYESIGHT
AT FANTASTICALLY DISCOUNTED PRICES!

Shielding your eyes from destructive ultraviolet sun rays is one of the most effective means of protection against ocular disease.

Consumers often spend hundreds of dollars on just one pair of so-called “designer” sunglasses. Life Extension® supporters can obtain superior protection against damaging solar radiation at a fraction of the price of commercially sold sunglasses.

SolarShield® sunglasses are recognized as the number-one doctor-recommended sunglasses in the world, with more than 50 million pairs sold to date. Patented SolarShield® sunglasses with durable polycarbonate lenses and 100% UV protection fit comfortably over prescription eyewear, providing convenient protection from the harmful effects of ultraviolet radiation.

SolarShield® is a registered trademark of Dioptics, Inc.

SolarShield® sunglasses • Item #00657

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Compare this low price to sunglasses sold in stores and see savings exceeding 90%!

For full product description and to order SolarShield® sunglasses, call 1-800-544-4440 or visit www.LifeExtension.com
It’s not easy to get in five servings of vegetables a day—and even if you do, cooking can destroy many of the protective compounds found in broccoli, Brussels sprouts, cauliflower, and celery.

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

The formula provides optimal potencies of cruciferous extracts like I3C (Indole-3-carbinol) and DIM (di-indolyl-methane) to favorably modulate estrogen metabolism,1-5 along with apigenin.

**Not Eating Enough Veggies? No Problem!**

Get Protective Benefits Of

**Cruciferous Vegetables**

*with Apigenin*

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**Triple Action Cruciferous Vegetable Extract**

Item #01468 • 60 vegetarian capsules

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**Triple Action Cruciferous Vegetable Extract with Resveratrol**

Item #01469 • 60 vegetarian capsules

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
Many ill effects of aging are caused by low-grade, chronic inflammation.

These slow-burning internal fires damage tissues and underlie many cancers, vascular disorders, and dementias.

Inflammation is partially regulated through the eicosanoid pathway.

Age, poor diet, and other factors tip the balance of this pathway from anti-inflammatory to pro-inflammatory.

Omega-3-rich fish oil rebalances the eicosanoid pathway and safely helps reduce inflammation.
What is the Eicosanoid Pathway?

The eicosanoid pathway is a signaling pattern that regulates inflammation when needed.

The eicosanoid pathway helps turn on inflammation when it’s needed and turn it off once it has done its job. This is accomplished through signaling molecules called eicosanoids.

There are two types of these signaling molecules—one that is pro-inflammatory, and one that is anti-inflammatory.

The pro-inflammatory signaling molecules are produced from omega-6 polyunsaturated fatty acids, whereas the anti-inflammatory molecules are mostly produced from omega-3 polyunsaturated fatty acids.1,5

Omega-3 also produces three additional classes of signaling molecules—called resolvins, protectins, and maresins. These go beyond suppressing inflammation by also promoting healing and actively protecting against cellular damage.3-8

The ratio of omega-6 to omega-3 is a major factor in determining whether the eicosanoid pathway will produce predominantly pro-inflammatory or anti-inflammatory signals.

Our typical Western diet contains far more omega-6 than omega-3 fats—an imbalance that pushes our eicosanoid pathway towards pro-inflammatory signaling, resulting in chronic inflammation.2

Fish oil improves the ratio of omega-6 to omega-3 thus reducing the incidence of age-associated inflammatory disorders—including cardiovascular, autoimmune, metabolic, and neurodegenerative diseases.

Inflammation-driven disease takes us down the road to premature disability and death. Reversing that inflammation with EPA- and DHA-rich fish oil represents a means of slowing certain aging processes.

In the next sections, we’ll review the evidence showing how fish oil supplements can have a beneficial impact on inflammatory-related conditions.

Cardiovascular Disease

Cardiovascular disease—which includes heart attacks, hypertension, strokes, atrial fibrillation, and heart failure—remains one of the leading killers worldwide.9

Inflammatory changes contribute to every point in the cascade of events that lead to cardiovascular catastrophe.

This includes promoting the development of atherosclerotic plaques and platelet clumping in arteries, as well as disrupting the electrical network of the heart itself.

Reducing the burden of inflammation is an important way to attack cardiovascular diseases before they become problematic. Fish oil/omega-3 supplementation is emerging as an important way to accomplish this task.
Human studies show that populations that consume large amounts of oily fish have reduced incidence of and deaths from cardiovascular disorders. This is due in part to fish oil’s ability to help lower triglycerides and reduce evidence of atherosclerosis. Omega-3 fish oil supplements have also been shown to improve endothelial function and stabilize arterial plaques (making them less likely to rupture and obstruct an artery).

EPA and DHA omega-3s produce profound shifts from the pro-inflammatory eicosanoids to protective, anti-inflammatory, vessel-dilating eicosanoids. There has long been interest in the ability of omega-3 supplementation to reduce the risk of atrial fibrillation, which is a cardiac rhythm disturbance that affects up to a third of people with hypertension. Atrial fibrillation can increase the risk of strokes and death, and is associated with inflammatory changes in the heart’s electrical system.

Ultimately—and most importantly—fish oil consumption has been shown to reduce coronary heart disease-related deaths.

Neurodegenerative Disorders

Alzheimer’s disease is the most prevalent neurodegenerative disorder. Inflammation plays a major role in its development. Omega-3s from fish oil are involved in both the reduction and resolution of inflammation through their impacts on the eicosanoid pathway—making them promising for the prevention of this debilitating disease.

Growing evidence indicates that, while DHA and EPA work together, they also have distinct individual influences on brain health. For example, EPA has been shown to improve symptoms of mood disorders (depression, anxiety), while DHA has a role in maintaining normal brain structures. Omega-3s cross the normally impermeable blood-brain barrier, making them available directly to brain cells.

What You Need to Know

Fish Oil Reduces Chronic Inflammation

- Inflammation triggers a cascade of destructive changes in cell and tissue function that leave us vulnerable to diabetes, cardiovascular disease, neurodegeneration, and even losses of bone and joint integrity.
- New studies show that we can control the balance of the eicosanoid pathway, tipping it back towards a low-inflammation, pro-resolution state, by supplementing with fish oil rich in the omega-3 fatty acids EPA and DHA.
- Animal and human studies now demonstrate the usefulness of fish oil supplements rich in EPA and DHA in mitigating the impact of diabetes, cardiovascular disease, neurodegenerative conditions, and skeletal health.
- Fish oil can be considered a fundamental anti-aging supplement because of its potent regulation of the eicosanoid pathway.
Studies of blood cells from Alzheimer’s disease patients show that supplementing with DHA and EPA for six months causes significant alterations in 19 genes involved in inflammation, neurodegeneration, and resolution of inflammation. This suggests that these beneficial fatty acids are regulating gene expression, which is a powerful epigenetic effect.16

Many of those changes result in increased production of three signaling molecules derived from omega-3s: resolvins, protectins, and maresins.17 As we learned earlier, these compounds have the dual benefit of resolving inflammation while also helping repair damaged tissue.

One way these omega-3-derived signaling factors afford protections is by increasing white blood cells’ appetite for consuming beta-amyloid, the toxic protein found in the brains of those with neurodegenerative diseases, while also reducing inflammation in the brain.8

Levels of these signaling molecules are reduced in people with Alzheimer’s disease and in those with minimal cognitive impairment (which commonly precedes Alzheimer’s).5,7,16

Omega-3 supplementation has been shown to beneficially support levels of these specialized molecules.17

One study showed that cognitive function in supplemented Alzheimer’s patients was closely associated with higher levels of resolvins, protectins, and maresins. Another showed benefit only in those with mild cognitive impairment, a grim reminder that early intervention is critical.8

An encouraging study in 2016 showed that supplementing with fish oil directly impacts brain size and structure in people with mild cognitive impairment.19 While placebo recipients in this study had decreased volume of gray matter in brain areas associated with Alzheimer’s disease, those taking the fish oil supplement (combined with aerobic exercise and cognitive stimulation) had unchanged, and in some cases increased volume of gray matter, the region of the brain involved in everything from memory and speech to emotions and decision-making.19

Check Omega Blood Levels and Understand Your Risk

The typical Western diet today contains a vast excess of omega-6 fats (largely derived from poultry products and certain vegetable oils).41,42

The optimum ratio of omega-6 to omega-3 fats in the diet is roughly 4 to 1, though some proponents claim the ratio should be two omega-6s for each one omega-3. Shockingly, those who follow unhealthy modern Western diets often consume these fats in ratios as high as 25 (omega-6) to only 1 (omega-3).2,41

Today we can determine our omega-6 to omega-3 ratio and much more through a finger stick test that can be ordered by calling Life Extension® at 1-800-208-3444 (24 hours).

Those findings help explain results of an earlier study, in which Alzheimer’s patients who supplemented with omega-3 had less decline in activities of daily living compared with placebo recipients. And when lipoic acid was added to the supplement, subjects showed even less decline in cognitive function.20

Diabetes

Type II diabetes is a ballooning epidemic that follows directly in the path of obesity and inflammation-driven insulin resistance. Fish oil’s ability to combat inflammation naturally protects against diabetes and its effects.

Animal research shows that fish oil supplementation improves metabolic factors associated with type II diabetes, including improving glucose tolerance (less insulin resistance) and decreased blood and liver lipid levels.21

Human studies have also demonstrated the benefits of omega-3s in diabetic patients. In one study, 30 obese type II diabetics took omega-3 supplements while following a protein-enriched diet with low glycemic-index carbohydrates. After 24 weeks, their hemoglobin A1c levels (a marker of chronic blood sugar elevation) diminished 11.1%, their waist circumference was reduced by 1.3 inches, and they experienced a significant reduction in C-reactive protein (CRP), the blood marker of inflammation.22
Fish oil/omega-3 supplements also protect us against the inflammation-related effects of diabetes.

In patients with type II diabetes, taking 4,000 mg/day of fish oil significantly reduced blood triglycerides and improved kidney function. In an animal study, giving diabetic rats fish oil improved diabetes-associated cognitive deficit, suppressed inflammatory changes, and protected brain cells against destruction.

Another major effect of diabetes is a decrease in cardiovascular disease. There's now strong evidence that diets high in omega-3 fish oil can reduce this deadly risk in diabetics by reducing artery-clogging platelet clumping and dangerous lipid elevations. Studies also show that diabetics who consume higher amounts of fish oil/omega-3s have lower blood pressure and are up to 19% less likely to die from cardiovascular disease.

A human study showed that omega-3 supplementation—combined with regular exercise—can reduce inflammatory changes and augment bone mineral density in postmenopausal women, the largest group at risk for osteoporosis.

Joint Health

Osteoarthritis is the most common cause of joint pain and disability in aging adults. The condition involves destruction of joint cartilage and remodeling of the bone just below cartilage—both of which are driven by chronic inflammation.

Not surprisingly then, adults with higher omega-6 to omega-3 ratios have greater pain, functional limitations, and psycho-social distress compared to those with lower ratios.

Studies in dogs, which notoriously suffer from osteoarthritis, show that fish oil omega-3 supplementation significantly improves weight-bearing ability and lowers the need for other anti-inflammatory drugs.

A human study from Germany demonstrated that the combination of omega-3 (EPA plus DHA) and glucosamine sulfate reduced morning stiffness and pain in the hips and knees more effectively than glucosamine sulfate alone.

Summary

Chronic, low-grade inflammation is linked to age-related conditions as varied as type II diabetes, cardiovascular disease risk, cognitive decline, aching joints, and osteoporosis.

We can help control our eicosanoid pathway functions by supplementing with omega-3 fish oil.

The EPA and DHA found in fish oil shifts the eicosanoid pathway into producing anti-inflammatory signals that reduce inflammation. These omega-3s have also been shown to promote the production of recently discovered resolvins, protectins, and maresins, compounds that have the dual benefit of resolving inflammation while also helping repair damaged tissue.

Human and laboratory studies point to an important role of fish oil supplementation in preventing many inflammation-driven, age-associated disorders, including diabetes, cardiovascular disease, neurodegeneration, and even bone and joint disorders.
References


Adapted from: F. Schunck


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BioActive Complete B-Complex provides enzymatically active forms of meaningful potencies of each B vitamin.

This includes the pyridoxal 5'-phosphate form of vitamin B6 shown to protect lipids and proteins against glycation and the most biologically active form of folate called 5-methyltetra-hydrofolate (5-MTHF), which is up to 7 times more bioavailable than folic acid.*

For full product description and to order BioActive Complete B-Complex, call 1-800-544-4440 or visit www.LifeExtension.com

Reference
Kenyan Tea Crystals deliver 2 times more polyphenols than other popular green teas.*

Just open a packet of Kenyan Purple or Green Tea Crystals, pour, and add hot water! No steeping!

Responsibly extracted using environmentally friendly PhytoClean™ technology.

For full product description and to order Kenyan Purple or Green Tea Crystals, call 1-800-544-4440 or visit www.LifeExtension.com

*Compared to Lipton and Tetley tea. PhytoClean™ is a trademark of Mazza Innovation, Ltd.

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

YOUR CHOICE OF HIGHLY-CONCENTRATED FORMULAS:

SUPER OMEGA-3 Fish oil
EPA/DHA with sesame lignans
and olive polyphenols

SUPER OMEGA-3 Fish oil
EPA/DHA with sesame lignans
and olive polyphenols
(Enteric-coated for
sensitive stomachs)

SUPER OMEGA-3 Fish oil
EPA/DHA with krill, astaxanthin,
sesame lignans,
and olive polyphenols

Smaller, easy-to-swallow
CLEARLY EPA/DHA
contains only highly purified fish oil

For full product description and to order Super Omega-3, Enteric Coated Super Omega-3, Super Omega-3 Plus, or Clearly EPA/DHA, call 1-800-544-4440 or visit www.LifeExtension.com

Highest Independent 5-star rating, International Fish Oil Society For Over Nine Years IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc.

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HEALTHY FLORA

One of the most exciting fields of scientific research is focused on the trillions of bacteria that live in our bodies.

Researchers have discovered that these flora play an enormous role in immunity as well as overall health.

Life Extension®’s FLORASSIST® products can help maintain that important digestive environment and support healthy function of the heart, throat, mood, digestive tract, oral hygiene, immune system, and nasal passages.

FLORASSIST® GI with Phage Technology
- Provides broad spectrum of healthy bacteria for the digestive tract plus phages that target undesirable intestinal bacterial strains.

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Item #02125 - 30 liquid vegetarian capsules

FLORASSIST® Heart Health
- Supports heart health.

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Item #01821 - 60 vegetarian capsules

FLORASSIST® Prebiotic
- Promotes friendly bacteria.

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Item #01821 - 60 vegetarian capsules

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

**FLORASSIST® Oral Hygiene**
- Supports healthy bacteria in gums.

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Item #02120 - 30 lozenges

**FLORASSIST® Mood**
- Positively influences the nervous system for healthy mood.

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Item #02000 - 60 capsules

**FLORASSIST® Nasal**
- Balances immune response to seasonal changes.

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Item #02208 - 30 vegetarian capsules

**FLORASSIST® Immune Health**
- Protects respiratory system from year-round immune challenges.

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Item #02124 - 30 vegetarian capsules

BLIS K12® is the registered trademark of BLIS Technologies Limited. PreticX™ is a trademark of AIDP Inc. BLIS™ and BLIS M18™ are trademarks of Blis Technologies Limited and the subject of USA patent no. 7226590. Immuno-LP20™ is a registered trademark of House Foods Group Inc. EpiCor® is a registered trademark of Embria Health Sciences, L.L.C. L-92® is a registered trademark of Asahi Calpis Wellness Co., Ltd., Tokyo, Japan.

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Aging is associated with the replacement of muscle by fat.

Waist circumference increases due to an increase in visceral fat, which causes chronic inflammation. Muscle loses quality and strength, contributing to the disabilities of old age.

Aging is also associated with increased insulin resistance and diabetes.

Physical inactivity accounts for many of these problems, which can be greatly reduced by exercise.

Exercise reduces blood glucose levels.

This report is based on the Exercise is Medicine conference held in Denver, Colorado, in June 2017. It reveals new findings on the favorable effects of even moderate increases in physical activity.
Fitness and Risk of Death

Robert Ross, Ph.D. (professor, Queen's University, Ontario, Canada) studies the health benefits of fitness. People who are fit have a lower risk of death—even if they smoke and have elevated cholesterol and blood pressure—compared to unfit people that have none of those risk factors.2

Patients with dyslipidemia (elevated blood cholesterol and triglycerides) who are highly fit but are not taking statins have a substantially lower risk of dying than dyslipidemia patients taking statins who are unfit.3

Dr. Ross was chair of a 2016 American Heart Association Committee that issued a report showing that low cardiorespiratory fitness is a stronger predictor of death than smoking, high cholesterol, type II diabetes, or high blood pressure.4

Inactivity and Blood Vessel Health

Jaume Padilla, Ph.D. (assistant professor, University of Missouri) is concerned with the effects of physical activity on endothelial function.

Endothelial dysfunction refers to the reduced capacity of blood vessel walls (the endothelium) to dilate and thereby increase blood flow. Endothelial dysfunction is one of the early changes contributing to atherosclerosis,5 a narrowing of the arteries that increases the risk of heart attack and stroke.6 A 1% increase in endothelial function is associated with a 13% reduced risk of cardiovascular disease.7

Exercise prevents the decline of endothelial function that occurs with age.7

In one experiment, Dr. Padilla showed that only five days of reduced activity (from 10,000 steps per day to 5,000 steps per day) substantially reduced endothelial function in leg arteries.8

He also showed that engaging in exercise prior to prolonged sitting could prevent the endothelial dysfunction normally caused by sitting.9 Even fidgeting the legs for one minute out of every five can prevent the endothelial dysfunction caused by sitting.10

Finally, Dr. Padilla has also demonstrated that the endothelial dysfunction of leg arteries resulting from six hours of continuous sitting could be reversed by a 10-minute walk.11

Exercise Against Aging

Brian Irving, Ph.D. (assistant professor, Louisiana State University) has an interest in the benefits of different types of exercise for the elderly. For example, resistance training, but not endurance training, has been shown to increase muscle size and mitochondrial density in the elderly.12 Endurance training does, however, prevent mitochondria from becoming dysfunctional.13

Dr. Irving’s team has shown that a combination of endurance and resistance exercise is the best way to improve cardiorespiratory fitness, muscle strength, and mitochondrial capacity.14

The team also demonstrated that the increase in insulin resistance that happens with aging is due to increasing fat rather than simply being an inevitable consequence of aging.15 Endurance exercise has been shown to increase insulin sensitivity.16
High Intensity Interval Training

Martin Gibala, Ph.D. (professor, McMaster University, Ontario, Canada) studies the effects of high-intensity interval training (HIIT). HIIT exercise involves alternating between a brief period of “all-out” effort for several seconds, and a period of resting recovery time.

Dr. Gibala conducted a study in which he compared 45 minutes of moderate intensity cycling with a HIIT protocol consisting of three 20-second “all-out” cycling efforts interspersed with 2 minutes of low-effort cycling. The two groups of previously inactive men exercised three times per week for 12 weeks.

The study showed that improvement in insulin sensitivity, cardiorespiratory fitness, and muscle mitochondrial content was the same for both groups, despite the fact that the moderate intensity cycling group spent five times more total time exercising than the HIIT group.

A review of the literature showed that when overweight/obese people practiced HIIT for more than 12 weeks, they experienced a reduction in body fat, waist circumference, and blood pressure, and an increase in cardiorespiratory fitness.

Dr. Gibala has established that HIIT can be achieved by stair-climbing as effectively as on an exercise bike.

Exercise Capacity and Heart Health

Jonathan Myers, Ph.D. (health research scientist, Veteran Affairs Health Care System, Palo Alto, California) has established that exercise capacity is a better predictor of the risk of death than smoking, diabetes, high blood pressure, or other exercise test results.

Exercise capacity is the maximum metabolic equivalent (MET) measured on exercise equipment. MET is the ratio of energy expended during an activity compared to the energy expended when a person is passive (such as watching television). Leisurely walking uses just over 2 METs of energy, whereas jogging uses about 7 METs.

Dr. Myers has also established that cardiorespiratory fitness (peak oxygen uptake during maximum exercise) is the best way to determine the exercise intolerance seen in heart failure patients.

Exercise testing requires equipment and trained staff that are often not available in medical facilities. So Dr. Myers has been evaluating questionnaires that estimate exercise capacity in order to attempt to predict mortality.

The single question, “How do you rate your cardiorespiratory fitness compared to your peers?” has proven to be very effective. Those who rated themselves lower than their peers have a 91% greater chance of dying of cardiovascular disease compared to those who rate themselves higher than their peers.
Benefits and Risks of Exercise

Barry Franklin, Ph.D. (professor, Wayne State University, Detroit, Michigan) is concerned with whether excessive exercise can be harmful.

Exercise reduces cardiovascular disease by improving the function of the heart\(^{24}\) and blood vessels.\(^{25}\) But excessive and vigorous exertion in those who have a poor cardiopulmonary condition and who are at increased risk of heart disease due to coronary artery disease or structural defects of the heart, has been shown to markedly increase the risk of sudden cardiac death and heart attack. Snow-shoveling is one confirmed cause of this, but any bout of excessive exercise in unfit, at-risk individuals can have this result.\(^{26,27}\)

Even in individuals without known heart disease, vigorous physical activity can increase the risk of acute heart attack and sudden cardiac death (SCD). This is because of the temporary stress placed on the heart by excessive exercise, making silent cardiac disease suddenly deadly when sedentary individuals overexert themselves.

This underlines the importance of beginning any program of physical activity gradually, with expert guidance, and only after a thorough evaluation of cardiovascular health and risk.

Exercise for Diabetes

Steven Malin, Ph.D. (assistant professor, University of Virginia) studies differences in insulin sensitivity, fat disposal, and the effects of exercise between individuals. He has been particularly interested in the ability of the pancreas to compensate for insulin resistance.

In the early stages of insulin resistance, blood glucose levels do not change because the pancreas can increase insulin production to compensate for the fact that insulin resistance increases the difficulty of getting glucose into cells. But eventually the pancreas becomes unable to compensate, which results in higher blood glucose and lower levels of insulin.\(^{28}\)

Dr. Malin highlights the importance of cardiorespiratory fitness for glycemic control and its importance in the production of insulin by the pancreas.\(^{29}\)

Exercise for Cognitive Function and Depression

Ryan Olson, Ph.D. (assistant professor, University of North Texas) is concerned with exercise, depression, and cognitive function.

More than 15% of the U.S. population will experience major depressive disorder at some point in their lifetime.\(^{30}\) Dr. Olson’s research suggests that depressed people ruminate about negative past experiences, and that the rumination contributes to cognitive impairment.\(^{30}\)

In an eight-week experiment in which depressed individuals did either stretching or endurance exercise, Dr. Olson found that endurance exercise reduced depressive symptoms by 58%, whereas stretching only reduced the symptoms by 22%.\(^{31}\) Endurance exercise also resulted in greater improvement in cognitive function.\(^{31}\)

A 12-week study of depressed individuals compared the exercise equivalent of walking three miles per hour for 75 minutes per week with walking four miles per hour for 210 minutes per week. The greater amount of exercise resulted in greater improvement of cognitive function.\(^{32}\)

Christiane Wrann, Ph.D. (assistant professor of Medicine, Harvard Medical School) is interested in how exercise improves cognitive function. Exercise results in the creation of new brain cells in the area of the brain concerned with the formation of new memories.\(^{33}\)
A study of healthy elderly people showed that those who did endurance exercise for six months experienced increased brain volume in the prefrontal and temporal cortex, the brain areas that normally show the greatest age-related deterioration.34

Dr. Wrann has been most interested in a protein called irisin that is secreted from muscle during exercise.35 She has found that irisin release is caused by another exercise-induced protein, PGC-1 alpha, which is a primary stimulator of mitochondrial biogenesis.36 Irisin reduces insulin resistance and obesity, and PGC-1 alpha has been shown to prolong lifespan in mice.37

Exercise in Pregnancy

Michelle Motolla, Ph.D. (professor, Western University, Ontario, Canada) studies the effects of exercise on pregnant women. Dr. Mottola has shown that pregnant women who do not exercise are 2.5 times more likely to give birth to an overweight infant, and three times more likely to develop high blood pressure.38

Every 2.2 pounds above average birthweight is associated with a 12% higher risk of dying from cardiovascular disease when the child becomes an adult.39 Women who exercise while pregnant reduce the risk of having an overweight newborn.40

Nearly half of the women who develop diabetes during pregnancy (called gestational diabetes) will have an overweight infant. These infants are likely to become an obese, diabetic adult.41 Dr. Mottola has conducted a clinical trial showing that exercise during pregnancy reduced the incidence of gestational diabetes and prevented excessive weight retention in the mothers after they gave birth.42

Concluding Remarks

Exercise can do much to reduce the disabilities of aging, prevent diabetes, and reduce the risk of dying from cardiovascular disease.

Physicians often find it easier to prescribe a pill rather than to prescribe exercise, despite the fact that exercise may be more effective. Patients also often find that it is more convenient to take a pill than to exercise.

Exercise is a medicine without the side effects of a drug. Too many people avoid experiencing the benefits of exercise at too great a cost.

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Pushpesh Pant is a 71-year-old Indian who is an intellectual, a historian, a retired professor of international relations, and a journalist specializing in all things food related. His true vocation in life, however, is as an advocate for Indian cuisine.

That passion led directly to Pant writing *India Cookbook*, a huge 815-page compendium of about 1,000 recipes, collected from all ten of India’s basic food regions.

Upon publication, *India Cookbook* was a major success, a best-seller that was heralded in the *New York Times* list of best cookbooks of the year.

“I was fortunate to have parents who recognized food can bring about change because it’s a mood manipulator,” says Pant. “Food becomes your body. It intoxicates you, poisons or revives you.”

Pant explains that he was “taught to think of all Indian food as my cultural heritage,” and he credits his mother for giving him a wide-ranging, secularist view of his native cuisine. When he was growing up, most families cooked meals that were strictly within their specific regional, religious, and caste traditions. But Pant’s mother liked to create pan-Indian meals, which required her to regularly go to great lengths to collect the necessary, often far-flung ingredients.

In his comprehensive *India cookbook*, which is based on 25 years of research, Pant prefaces his recipes with a history of Indian food and an overview of India’s food regions. He also provides a brief note on Ayurveda, the traditional Hindu system of medicine, and explains its relationship to diet.

*Life Extension*® here collects some sample recipes from Pant’s monumental work. All feature ingredients known for their health benefits, such as nuts, turmeric, garlic, cumin, ginger, and tomatoes.

—Garry Messick
**Bharwan Bhindi**  
**Stuffed Okra**  
ORIGIN: Punjab •  Preparation time: 30 minutes  
Cooking time: 20-25 minutes • Serves 4

**INGREDIENTS**
- 500 g / 1 lb. 2 oz. okra, topped and tailed (trimmed), cut in half lengthways, then de-seeded.
- Salt

**For the filling**
- 1 teaspoon ground turmeric
- 1 teaspoon ground black cardamom
- 1 teaspoon ground fennel
- 1 ½ teaspoons ground cumin
- 1 teaspoon ground black pepper
- 2 ½ tablespoons vegetable oil or ghee
- 1 tablespoon amchoor
- 1 teaspoon ground coriander
- 2 teaspoons chili powder
- ¼ teaspoon ground nutmeg
- Pinch of salt

**For the sauce**
- 1 ½ teaspoons chili powder
- ½ teaspoon ground turmeric
- 4 tablespoons vegetable oil or ghee
- 125 g / 4 ½ oz. (½ cup) ghee
- 125 g / 4 ¼ oz. (½ cup) natural (plain) yogurt, whisked
- 500 g / 1 lb. 2 oz. (7 cups) mushrooms, chopped
- 75 g / 2 ½ oz. lotus puffs
- Salt

To make the filling, mix all the ingredients together in a bowl. Fill the okra with equal quantities of the mixture and set aside.

To make the sauce, mix the chili powder and turmeric in a small bowl with 2 tablespoons water.

Put the ground spices in a small bowl, add 4 tablespoons water and mix together.

Heat the oil or ghee in a deep, heavy-based pan over medium heat, add the onion and fry for 3-4 minutes, or until translucent and glossy. Add the chili powder mixture and stir-fry for about 3-4 minutes, or until all the moisture has evaporated, then add the stuffed okra, increase the heat to medium, cover and cook, stirring occasionally, for 7-8 minutes.

Remove from the heat, stir in the yogurt, and season with salt. Return to the heat and cook, stirring occasionally, but carefully, for about 5 minutes, or until the sauce is quite thick. Remove from the heat and adjust the seasoning, if necessary.

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**Kaju Khumb Makhane**  
**Mushrooms with Cashew Nuts**  
ORIGIN: Rajasthan •  Preparation time: 20 minutes  
Cooking time: 30 minutes • Serves 4

**INGREDIENTS**
- 1 ½ teaspoons chili powder
- 1 teaspoon ground turmeric
- 1 teaspoon ground coriander
- 125 g / 4 ¼ oz. (½ cup) ghee
- 150 g / 5 oz. (1 medium) onion, grated
- 1 teaspoon kalonji (nigella) seeds
- 1 teaspoon cumin seeds
- 2 ½ tablespoons ginger paste (see next page)
- 1 ½ tablespoons garlic paste (see next page)
- 250 g / 9 oz. (1 large) tomato, chopped
- 175 ml / 6 fl oz. (3/4 cup) natural (plain) yogurt, whisked
- 500 g / 1 lb. 2 oz. (7 cups) mushrooms, chopped
- 75 g / 2 ½ oz. (½ cup) cashew nuts, roasted
- 75 g / 2 ½ oz. lotus puffs
- Salt
- 1 large sprig coriander (cilantro), chopped, to garnish

Put the ground spices in a small bowl, add 4 tablespoons water and mix together.

Heat the ghee in a large, heavy-based pan over medium heat, add the onions and fry for about 5-7 minutes, or until golden brown. Add the kalonji and cumin seeds and stir-fry for about 1 minute, or until they start to sputter. Add the ginger and garlic pastes and stir-fry for about 1-2 minutes, then add the ground spice mixture and stir-fry for 2 minutes. Add the tomatoes and fry for about 5 minutes, or until the oil separates out.

Remove the pan from the heat and slowly stir in the yogurt. Season with salt, then return to the heat and pour in about 250 ml / 8 fl oz. (1 cup) of water. Bring almost to a boil, then reduce the heat and simmer for a few minutes until the sauce thickens. Add the mushrooms and simmer for a further 5 minutes. Add the cashew nuts and lotus puffs and stir to mix well. Remove from the heat, adjust the seasoning, if necessary, and garnish with chopped coriander.
Subzi Panchmel
Mixed Vegetables

ORIGIN: New • Preparation time: 25 minutes
Cooking time 10-12 minutes • Serves 4

INGREDIENTS
100 g / 3 ½ oz. (3 small) new (baby) potatoes
3 tablespoons mustard oil
2 onions, chopped
8 cloves garlic, chopped
10 baby corn
400 g / 14 oz. mushrooms, stalks removed
1 red (bell) pepper, cut into julienues
1 yellow (bell) pepper, cut into julienues
120 g / 4 oz. (1 small) tomato, pureéd
1 ½ teaspoons coriander seeds, roasted, then pounded in a mortar and pestle
1 teaspoon coarsely ground black pepper, roasted
1 x 2.5-cm / 1-inch piece fresh ginger, peeled and sliced
2 tablespoons chopped coriander (cilantro) leaves
Salt

Cook the potatoes in a medium-sized pan of water for about 10 minutes, or until soft. Drain and set aside.

Heat the oil in a large heavy-based pan over high heat, then reduce the heat to medium. Add the onions and fry for about 2 minutes, or until translucent. Add the garlic and fry for about 2-3 minutes, or until the onions turn light golden. Add the baby corn, potatoes, mushrooms, and peppers, then increase the heat to high and stir-fry for about 2 minutes, or until the baby corns are cooked. Add the puréed tomato and stir-fry for a further 1 minute to ensure that the purée coats the vegetables evenly. Sprinkle over the coriander seeds, pepper, ginger, and season with salt, then stir. Add the chopped coriander leaves and stir again. Remove from the heat and adjust the seasoning, if necessary.

Pisi Adrak
Ginger Paste

ORIGIN: Pan-India • Preparation time: 20 minutes, plus chilling time • Makes about 250 g / 9 oz.

INGREDIENTS
1 x 14-cm / 5 ½-inch piece fresh ginger, peeled and roughly chopped

Put the ginger in a blender, add 3 tablespoons water and process to make a smooth paste. Transfer to a container and chill in the refrigerator. This paste can be stored for up to 3 days in the refrigerator.

Pisi Lehsun
Garlic Paste

ORIGIN: Pan-India • Preparation time: 15 minutes, plus chilling time • Makes about 200 g / 7 oz.

INGREDIENTS
200 g / 7 oz. (about 5 heads) roughly chopped garlic

Put the garlic in a blender, add 3 tablespoons water and process to make a fine paste. Transfer to a container and chill in the refrigerator. This paste can be stored for up to 3 days in the refrigerator.

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

Reprinted from India Cookbook (Phaidon 2010) by Pushpesh Pant.
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Purple Cauliflower

BY GARRY MESSICK

Cauliflower is a member of the Brassicaceae family of plants. As such, it’s related to a number of other healthy foods, including kale, cabbage, broccoli, and Brussels sprouts.

In its most common form, white cauliflower, the vegetable has substantial nutritional value. Purple cauliflower adds an important ingredient to the mix. Let’s take a closer look at this, as well as other benefits to be derived from this valuable vegetable.

**Anthocyanins**

Purple cauliflower’s color is due to its high anthocyanin content. Anthocyanins are part of the flavonoid family of phenolic compounds. They are pigments that lend color to everything from blueberries to red wine, and are the reason leaves change color in autumn.

Research shows that anthocyanins may help fight cardiovascular disease. One study that followed over 34,000 post-menopausal women over a 16-year period found that those who ate anthocyanin-rich fruits on a weekly basis had significantly reduced risk of dying from coronary artery disease.1

Another study found that anthocyanins were associated with lower arterial stiffness and significantly lower systolic blood pressure.2

Due to their status as oxidant reducers, as well as an ability to activate detoxifying enzymes, anthocyanins have also shown remarkable anti-cancer properties, including preventing cancer cell proliferation, inducing cancer-cell death, and inhibiting the formation of blood vessels that promote tumor growth.3

**Glucosinolates**

Cruciferous vegetables such as purple or white cauliflower are rich in the sulfur-containing compounds known as glucosinolates, which, among other benefits, have significant system-wide anti-inflammatory effects.4

**Detoxification**

Purple and other varieties of cauliflower contain the compounds gluconasturtiin, glucoraphanin, and glucobrassicin, which stimulate Phase II enzymes. These act as the body’s natural oxidant reducers and support liver function by helping to prompt detoxifying enzymes that block damage from free radicals.5

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Gillean McLeod
This Fashion Model is a Baby-Boomer Role Model

Having modeled in swimsuit and clothing campaigns for global fashion giants such as H & M, Uniqlo and Carolina Herrera, 62-year-old Gillean McLeod also works in the advertising industry as a fashion stylist for leading international brands like Adidas, Virgin America and Honda. One of the world’s fittest fashionistas at any age, the statuesque McLeod stands 5 feet, 10 inches, and is distinguished by her waist-length mane of long, lush silver hair.

Based in Los Angeles where she hikes and swims outdoors year-round, McLeod is living proof that it’s possible for baby boomers to embody radiant health, and happiness without spending a fortune on personal gyms, nutritionists, or cosmetic surgery. What’s more, the fact that she’s figured out a free and effective formula for optimal health and wellness after 60 makes her a role model for people of all ages.

“Staying strong, fit, and energetic is a multitasking, part-time job that I work at every day,” McLeod says with a laugh. “But it’s one that gets easier every year.”

Having lived in Los Angeles for more than three decades, she says, “It seems perfectly natural to pursue a healthy lifestyle, because there are endless free and enjoyable opportunities for doing so. My main goal in taking care of myself is to feel energized and strong rather than conforming to some media-induced beauty ideal.”
McLeod exemplifies how easy it can be to stay in shape at any age. “As I live near a city park that’s equipped with a full circuit of strength-training machines, I can get in a workout any time I want, plus do a little bird watching,” she explains.

“Sometimes, there are hawks and green parrots flying nearby while I’m working on the parallel bars pulling my knees up to my chest. It’s such a blast to work out in a free outdoor gym where exercising feels playful and fun, as opposed to the typical indoor fitness center where it’s noisy, hot and crowded, and people are waiting impatiently for you to get off the machines.”

When she models or does fashion styling in other cities, McLeod Googles public parks and adult playgrounds and then heads off to the great outdoors.

“Check out your city’s parks and adult-scaled playgrounds,” she suggests. “Some of them even have heated swimming pools.” Fortunately for her, McLeod’s local park has a pool where she does lap swimming.

“I’ve always been a swimmer,” she says. “I was born in Indonesia and grew up in the tropics swimming every day, loving the backstroke and competing on teams and essentially living in my bathing suit.” Now she swims a mile and a half, four times a week and occasionally takes swimming lessons through the park’s master’s program.

“At the age of 50, I learned how to do the butterfly, a stroke that I never imagined mastering. It feels so exhilarating to finally be doing that butterfly kick. I’m not a fast swimmer,” McLeod confesses, “but I pride myself on my endurance.”

McLeod’s lifelong love of swimming made her the star of H & M’s global swimsuit ad campaign for 2016.

“The photographer chose to shoot me before I even had a chance to get my hair and makeup done,” she recalls.

When H & M posted the image of McLeod suited up and smiling on Instagram, the portrait generated 200,000 likes in one week plus hundreds of comments thanking the company for choosing a fit and mature woman rather than the typical teenage, super-skinny swimsuit model. As McLeod says, “That image went viral and became a news story around the world. Everyone from Time magazine to The Hollywood Reporter to The Telegraph interviewed me about how this breakthrough ad campaign was showing how older women can still be strong, confident and fit in later life.”

Another key reason why McLeod feels so comfortable in her swimsuit is that she has been toning and strengthening her body in Pilates classes for the past ten years. When her work schedule permits, she takes four advanced classes a week at The Moving Joint in West Los Angeles. Extolling the virtues and holistic benefits of this form of exercise, she says, “Pilates is more than just a physical regimen, it’s also a mind-body and breathing discipline. All the focused breathing helps calm down your nervous system.”

McLeod loves this form of fitness so much that she even has her own Pilates Reformer machine.

“I work out on it after a long day of shooting in a concrete-floored photo studio or after unavoidably long car commutes, and it dissolves the stresses of the day and renews my energy.

“I put my legs in the Reformer straps and do leg circles for 25 minutes along with stretching exercises, and all the time I’m breathing rhythmically. The coordinated exercises and mindful breathing helps improve blood circulation, while activating my heart rate and rejuvenating my spine after a long drive.”

Thanks to hiking trails in nearby canyons, McLeod gets plenty of heart-pumping exercise with panoramic views.

Gillean’s Favored Supplements

On a daily basis, Gillean McLeod takes a multivitamin, vitamin D, prebiotics, probiotics, calcium, magnesium, vitamin C, and extra zinc during autumn and winter.
“If I have a free afternoon,” she says, “I love to hike 2,600 feet up into the foothills of the San Gabriel Mountains so that I can see the Pacific Ocean and all the way to Catalina Island. I typically do a six-mile round-trip hike and take time to enjoy the lovely views.”

For rejuvenation closer to home, McLeod heads to her backyard garden and pond, which abounds with aloe and other succulents, lime trees and native flowers.

“I grow a dozen different kitchen herbs, including three types of basil,” she says. “I also typically plant tomatoes, peppers, kale and other vegetables in raised beds. I love to cook with the vegetables from my garden as well as share them with my neighbors.”

McLeod’s diet became vegetable-focused 30 years ago, after her toddler son ate some E. coli-tainted beef and ended up in the hospital fighting for his life.

“After my son recovered from that frightening and unforgettable experience, I stopped eating meat in restaurants and switched to cooking all organic foods for me and my family. Since then, I have only been eating organically raised chicken, organic bison and occasionally, wild caught fish.”

Staples of her diet include green leafy vegetables such as kale, beans, lentils, and organic quinoa, as well as fresh-squeezed organic vegetable juice and bison bone broth.

“Bone broth feels very soothing and nourishing to me,” she says. “I feel like it gives me energy and I drink this as often as possible, especially in winter.”

Anything that saps energy, such as sugar, alcohol, and fried foods are absent from McLeod’s diet.

“I felt that alcohol was tiring me out even only after a few drinks, so I gave it up entirely several years ago,” McLeod says. “It is a poison, after all. I drink mineral water when I’m socializing and never miss it.”

Just as food nourishes the body and mind, “So does sleep,” she says. “Getting a good night’s rest is absolutely essential because I often travel for work and thus experience jet lag, nighttime hotel noise and early morning start times.”

McLeod always carries clothespins for her styling work, since they come in handy for closing gaps in room curtains to create a darker bedroom. Another tip: “To muffle hallway noise and block light that may enter through gaps between the door and the floor, roll up towels and wedge them against the room door.”

One hour or more before bedtime, McLeod switches off her electronic devices and takes a warm shower or bath to downshift into relaxation mode.

“iPhones, e-readers, computers and iPads emit, among other things, blue daylight spectrum light,” she explains. “This is artificial light that convinces the body it’s still daytime rather than bedtime. Working on e-devices before bedtime deceives the body into staying awake by blocking the hormone melatonin, which causes delays in sleep onset.”

To ease into sleep at home, on an airplane or in a hotel room, McLeod does a variety of relaxation exercises featured on various relaxation response apps, which are available online.

“I like the 20-minute ones that slow you down and help you focus on breathing so that you drift off to sleep fully relaxed,” she says. “Meditation has numerous clinically proven benefits that have been published in peer-reviewed medical journals. It’s another form of nourishment, a potential source of healing and a lifelong, free and life-enhancing tool that we can use anytime, anywhere.”

Whenever we practice mindfulness and meditation and downshift into deep, relaxed breaths, McLeod says, “We turn off the automatic and hyper-reactive sympathetic nervous system, which triggers the fight-or-flight stress response, and activate our parasympathetic nervous system (PNS). This is the body system which soothes and helps us to relax.”

When the PNS is activated through meditation or other means, heart rate and blood pressure drop, breathing slows down and deepens and the muscles relax.

“It’s a fact that meditation promotes good digestion, supports immune function, enhances feelings of well-being and sends you off to sleep,” McLeod says. “We’re very lucky to live in an age when there are so many scientifically proven self-help health and fitness methods that we can learn about and practice.”

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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Foot Reflexology Chart

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[KEYNOTE TOPICS]

- Newly Diagnosed
- Diet & Exercise
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5990 NORTH FEDERAL HIGHWAY
FT. LAUDERDALE, FL, 33308-2633

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## Genetic Testing

### CBC/Chemistry Profile (LC381822)

**Includes:**
- Lipid Profile:
  - Total cholesterol • Triglycerides
  - HDL cholesterol • LDL cholesterol (calc.)
  - VLDL cholesterol (calc.)
  - Total cholesterol/HDL ratio
  - Estimated Coronary Heart Disease risk
- Liver Function:
  - Alkaline phosphatase • LDH (lactate dehydrogenase)
  - AST (aspartate aminotransferase)
  - ALT (alanine transaminase)
  - Total protein • Albumin • Globulin
  - Albumin/globulin ratio • Bilirubin
- Electrolytes and Minerals:
  - Sodium • Potassium • Chloride
  - Calcium • Phosphorus • Iron

**Blood Sugar:**
- Glucose

**Kidney Function:**
- Uric acid • BUN (blood urea nitrogen)
- Creatinine • BUN/creatinine ratio
- eGFR (estimated glomerular filtration rate)

**Complete Blood Count:**
- Red blood cell count • Hemoglobin
- Hematocrit • MCV (mean corpuscular volume)
- MCH (mean corpuscular hemoglobin)
- MCHC (mean corpuscular hemoglobin concentration)
- RDW (red blood cell distribution)
- White blood cell count
- Immune Cell Differentiation Count
- Platelet count

**Price:**
- $35

### Neurotransmitter Basic Panel** (LC100058)
- Serotonin, Dopamine, Epinephrine, Norepinephrine, GABA, Glutamate, Glycine, Histamine, and PEA. Alternations in these nine neurotransmitters play a significant role in contributing to symptoms such as cognitive disorders, depression, anxiety, diminished drive, fatigue and sleep difficulties, cravings, addictions, pain and more! Not available in NY.

**Price:**
- $199

### Food Safe Allergy Test – Basic** (LCM73001)
- This test measures delayed (IgG) food allergies for 95 common foods.

**Price:**
- $198

### Toxic Metals Panel (Fecal)** (LC100076)
- The results of fecal elemental analysis can help you identify and eliminate dietary exposure to toxic metals, while also assessing the body’s natural excretion of metals. The panel tests Antimony, Arsenic, Beryllium, Bismuth, Cadmium, Copper, Lead, Mercury, Nickel, Platinum, Thallium, Tungsten, and Uranium.

**Price:**
- $170

### Food Safe Allergy Test – Combo** (LCM73003)
- This test measures delayed (IgG) food allergies to all 190 foods found in our Basic and Extended panels.

**Price:**
- $375

### DNA Genetic Cancer Risk Profile** (LC100057)
- With only a saliva sample, you can identify your risk for 25 hereditary cancers by analyzing 98 genes from your DNA including the well-known BRCA1, BRCA2, TP53, and APC. Not available in NY and RI.

**Price:**
- $299

### APOE Genetic Test for Alzheimer’s and Cardiac Risk** (LC100059)
- Apolipoprotein E (ApoE) is an important regulator of cholesterol and triglycerides levels in your blood and supports lipid transport and injury repair in your brain. Genetically, E4 is the strongest risk factor for developing Late Onset Alzheimer’s disease. According to the National Institute of Health, inheriting a single copy of ApoE4 increases the risk of Alzheimer’s disease by about three-fold. Inheriting two copies increases the risk by about 12-fold. In fact, almost 40% of AD patients have inherited an E4 allele.

**Price:**
- $149

### Pathway Fit® DNA Weight Management (LC100067)
- Your DNA holds the blueprint to how your body responds to both food and exercise. This panel looks at 40+ genetic traits.

**Price:**
- $299

### Pain Medication DNA Insight® Profile (LC100069)
- This profile helps you understand your body’s likely response to 13 commonly prescribed pain medications.

**Price:**
- $299

### Mental Health DNA Insight® Profile (LC100068)
- The Mental Health DNA Insight profile helps you understand your body’s likely response to 50+ psychiatric medications.

**Price:**
- $299
### BLOOD TEST PANELS

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<th>Panel Name</th>
<th>Price</th>
<th>Description</th>
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<tr>
<td><strong>MALE LIFE EXTENSION PANEL (LC322582)</strong></td>
<td>$269</td>
<td>CBC/Chemistry Profile: DHEA-S • PSA (prostate-specific antigen) • Homocysteine • C-Reactive Protein (high-sensitivity) • Apolipoprotein B (ApoB) • Testosterone • Estradiol • TSH for thyroid function • Vitamin D (25-hydroxyvitamin D) • Hemoglobin A1c</td>
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<td><strong>MALE ELITE PANEL (LC100016)</strong></td>
<td>$575</td>
<td>CBC/Chemistry Profile: Free and Total Testosterone • Total Estrogens • Estradiol • DHEA-S • Progesterone • Pregnenolone • DHT • FSH • LH • TSH • Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)</td>
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<td><strong>MALE COMPREHENSIVE HORMONE PANEL (LC100010)</strong></td>
<td>$299</td>
<td>CBC/Chemistry Profile: DHEA-S, Estradiol • Total Estrogens • Estradiol • Total and Free Testosterone • SHBG • TSH • Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)</td>
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<td>$575</td>
<td>CBC/Chemistry Profile: Free and total Testosterone • Total Estrogens • Estradiol • Estrone • DHEA-S • Progesterone • Pregnenolone • Apolipoprotein B (ApoB) • DHT • FSH • LH • TSH • Free T3 • Free T4 • Reverse T3 • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)</td>
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<td>CBC/Chemistry Profile: DHEA-S, Estradiol • Total Estrogens • Progesterone • Pregnenolone • Total and Free Testosterone • SHBG • TSH • Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)</td>
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<td>DHEA-S • Estradiol • Total and Free Testosterone • Progesterone</td>
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**NMR LIPOPROFILE® (LC123810)**

- The NMR Lipoprofile® directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one's risk of insulin resistance by assessing abnormalities in lipoprotein markers.

**WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028)**

- CBC/Chemistry Profile: DHEA-S • Free and Total Testosterone • Estradiol • Cortisol • TSH • Free T3 • Free T4 • Reverse T3 • Insulin • Hemoglobin A1c • Vitamin D 25-hydroxy • C-reactive protein (high sensitivity) • Ferritin

**HEALTHY AGING PANEL-COMPREHENSIVE (LC100026)**

- CBC/Chemistry Profile: DHEA-S • Estradiol • Total Estrogens • Estradiol • Total and Free Testosterone • SHBG • TSH • Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB) • Vitamin B12 • Folate • Homocysteine • Vitamin D 25-hydroxy • Hemoglobin A1c • TSH • Free T3 • Free T4 • Ferritin • Urinalysis • Fibrinogen • Insulin

**FEMALE LIFE EXTENSION PANEL (LC322585)**

- CBC/Chemistry Profile: DHEA-S • Estradiol • Homocysteine • C-Reactive Protein (high-sensitivity) • Progesterone • Free Testosterone • Total Testosterone • TSH for thyroid function • Apolipoprotein B (ApoB) • Vitamin D (25-hydroxyvitamin D) • Hemoglobin A1c

**FEMALE ELITE PANEL (LC100017)**

- CBC/Chemistry Profile: Free and total Testosterone • Total Estrogens • Estradiol • Estrone • DHEA-S • Progesterone • Pregnenolone • Apolipoprotein B (ApoB) • DHT • FSH • LH • TSH • Free T3 • Free T4 • Reverse T3 • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)

**FEMALE COMPREHENSIVE HORMONE PANEL (LC100011)**

- CBC/Chemistry Profile: DHEA-S, Estradiol • Total Estrogens • Progesterone • Pregnenolone • Total and Free Testosterone • SHBG • TSH • Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c • Vitamin D 25-OH • hs-CRP • Ferritin • Homocysteine • Hemoglobin A1c • Apolipoprotein B (ApoB)

**FEMALE BASIC HORMONE PANEL (LC100013)**

- DHEA-S • Estradiol • Total and Free Testosterone • Progesterone

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**Blood tests available in the continental United States only. Restrictions apply in NY, NJ, RI, and MA. Not available in Maryland. Kits not available in Pennsylvania.**

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- Branched Chain Amino Acids
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- L-Arginine Caps
- L-Carnitine
- L-Glutamine
- L-Glutamine Powder
- L-Lysine
- L-Taurine Powder
- L-Tyrosine Powder
- Super Carnosine
- Taurine

**Blood Pressure & Vascular Support**
- Advanced Olive Leaf Vascular Support
- with Celery Seed Extract
- Arterial Protect
- Blood Pressure Monitor Arm Cuff
- Endothelial Defense™ with Pomegranate Complete and CORDIART™
- Endothelial Defense™ with GliSODin®
- Optimal BP Management
- NitroVasc with CORDIART™
- Pomegranate Complete
- Pomegranate Fruit Extract
- Triple Action Blood Pressure AM/PM
- VenoFlow™

**Bone Health**
- Bone Restore
- Bone Restore-Sugar Free
- 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

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- Blast™
- Brain Shield® Gastrodin
- CocoaMind™
- 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
- Optimized Aswaghanda Extract
- PS (Phosphatidylserine) Caps
- Vinpocetine

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- Homocysteine Resist
- Optimized Carnitine
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- Super Ubiquinol CoQ10 with PQQ
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- Triple Action Cruciferous Vegetable Extract

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- Kyolic® Garlic Formula 102
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- Lactoferrin (apolaftocerin) Caps
- NK Cell Activator™
- Optimized Garlic
- Optimized Quercetin
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- Chlorophyll
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- N-Acetyl-L-Cysteine
- PectaSol® C™
- Silymarin
- SODzyme® with GliSODin® & Wolfberry

**Longevity & Wellness**
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- AppleWise Polyphenol Extract
- Berry Complete
- Blueberry Extract
- Blueberry Extract with Pomegranate
- DNA Protection Formula
- Enhanced Berry Complete with Acai
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**SUBTOTAL OF COLUMN 1**

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**SUBTOTAL OF COLUMN 2**

TO ORDER CALL: 1.954.766.8433 or 1.800.544.4440 ■ TO ORDER ONLINE VISIT: www.LifeExtension.com
<table>
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<th>ITEM No.</th>
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<td>COGNIZIN® CD•CHOLINE CAPS • 250 mg, 60 veg. caps</td>
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<td>COMFORTMAX™ • 30 day supply</td>
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<td>COQ10 (Super Ubiquinol) • 100 mg, 60 softgels</td>
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<td>CRAN-MAX® WITH ELLIROSETM (Optimized) • 60 veg. caps</td>
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<td>CREATINE CAPSULES • 120 veg. caps</td>
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<td>CURCUMIN® W/GINGER &amp; TURMERONES (Advanced Bio) • 30 softgels</td>
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### COSMEIS

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<td>ADVANCED ANTI-GLYCATION PEPTIDE SERUM • 1 fl. oz</td>
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<td>ADVANCED GROWTH FACTOR SERUM • 1 fl. oz</td>
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<td>ADVANCED PEPTIDE HAND THERAPY • 4 oz</td>
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<td>ADVANCED UNDER EYE SERUM W/STEM CELLS • .33 fl. oz</td>
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<td>AMBER SELF MICRODERMABRASION • 2 oz</td>
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**RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

**SUBTOTAL OF COLUMN 3**

**SUBTOTAL OF COLUMN 4**

**JULY 2018**
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<td>SORORSSE • 30 caps</td>
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<td>DIGESTIVE ENZYMES (Enhanced Super) • 60 veg. caps</td>
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<td>DIGESTIVE ENZYMES PROBIOTICS (Enhanced Super) • 60 veg. caps</td>
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<td>01671</td>
<td>L-PHENYLALANINE • 500 mg, 100 veg. caps</td>
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<td>01540</td>
<td>DMAE BITARTRATE • 150 mg, 200 veg. caps</td>
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<td>02270</td>
<td>DNA PROTECTION FORMULA • 30 veg. caps</td>
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<td>DOG MIX • 100 grams powder</td>
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<td>02006</td>
<td>DOPA-MIND™ • 60 veg. tabs</td>
<td>44.00</td>
<td>00321</td>
<td>DR. PROCTOR’S ADVANCED HAIR FORMULA • 2 oz</td>
<td>39.95</td>
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<td>00320</td>
<td>DR. PROCTOR’S HAIR SHAMPOO • 8 oz</td>
<td>24.95</td>
<td>01987</td>
<td>ENDOTHELIAL DEFENSE® w/POMEGRANATE COMPLETE AND CODIART™ • 60 softgels</td>
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<td>00997</td>
<td>ENDOTHELIAL DEFENSE® w/GLISODIN® • 60 veg. caps</td>
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<td>EPA/DHA (Clearly) • 120 softgels</td>
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<td>02033</td>
<td>ESOPHAGUL® • 60 chewable tablets</td>
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<td>ESOPHAGEAL GUARDIAN (Berry flavor) • 60 chewable tablets</td>
<td>36.00</td>
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<td>01894</td>
<td>ESTRIGEN FOR WOMEN • 30 veg. tabs</td>
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<td>01402</td>
<td>EUROPEAN LEG SOLUTION DIOSMIN 95 • 600 mg, 30 veg. tabs</td>
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<td>01706</td>
<td>EXTRAORDINARY ENZYMES • 60 caps</td>
<td>26.00</td>
<td>02008</td>
<td>(CALIFORNIA ESTATE) EXTRA VIRGIN OLIVE OIL • 500 ml (16.9 fl. oz)</td>
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<td>01514</td>
<td>EYE PRESSURE SUPPORT W/MIRTGENOL® • 30 veg. caps</td>
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<td>FAST-ACTING JOINT FORMULA • 30 caps</td>
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<td>01717</td>
<td>FAST-C® w/DIHYDROQUERCETIN • 120 veg. tabs</td>
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<td>01664</td>
<td>FEMMENESSENCE MACAPOSE® • 120 veg. caps</td>
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<td>02125</td>
<td>FLORASSIST® GI w/PHAGE TECHNOLOGY • 30 liquid veg. caps</td>
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<td>01821</td>
<td>FLORASSIST® HEART HEALTH • 60 veg. caps</td>
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<td>FLORASSIST® IMMUNE HEALTH • 30 veg. caps</td>
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<td>FLORASSIST® ORAL HYGIENE • 30 lozenges</td>
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<td>FLORASSIST® BALANCE • 30 liquid veg. caps</td>
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<td>FLORASSIST® MOOD • 60 caps</td>
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<td>FLORASSIST® NASAL • 30 veg. caps</td>
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<td>FLORASSIST® PREBIOTIC • Natural Strawberry, 60 chewable tabs</td>
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<td>FLORASSIST® THROAT HEALTH • 30 lozenges</td>
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<td>FOLATE HIGH POTENCY (Optimized) • 5,000 mcg, 30 veg. tablets</td>
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<td>FOLATE (Optimized) • 1,000 mcg, 100 veg. tablets</td>
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<td>FOLATE + VITAMIN B12 (Bioactive) • 90 veg. caps</td>
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<td>FORSKOLIN • 10 mg, 60 veg. caps</td>
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<td>FUCOIDAN W/MARITECH® 926 (Optimized) • 60 veg. caps</td>
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<td>GAMMA E MIXED TOCOPHEROL/TOCOTRIENOLS • 60 softgels</td>
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<td>02075</td>
<td>GAMMA E MIXED TOCOPHEROL W/WHITENED SESAME SEEDS • 60 softgels</td>
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<td>GARLIC (Optimized) • 200 veg. caps</td>
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<td>GASTRO-EASE™ • 60 veg. caps</td>
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<td>GEROPROTECT® AGELESS CELL™ • 30 softgels</td>
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<td>GLA WITH SESAME LIGNANS (Mega) • 60 softgels</td>
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<td>(L-) GLUTAMINE CAPSULES • 500 mg, 100 veg. caps</td>
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<td>00141</td>
<td>(L-) GLUTAMINE POWDER • 100 grams</td>
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<td>GLUCOSAMINE/CHONDROITIN CAPSULES • 100 caps</td>
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<td>01541</td>
<td>GLUTATHIONE, CYSTEINE &amp; C • 100 veg. caps</td>
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<td>0122</td>
<td>GLYCEMIC GUARD™ • 30 veg. caps</td>
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<td>GLYCINE • 1,000 mg, 100 veg. caps</td>
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<td>GRAPE SEED EXTRACT W/RESVERATROL &amp; PTEROSTILBENE • 100 mg, 60 veg. caps</td>
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<td>01620</td>
<td>GREEN COFFEE EXTRACT COFFEENIC® 400 mg, 90 veg. caps</td>
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<td>00953</td>
<td>GREEN TEA EXTRACT (Mega) lightly caffeinated, 100 veg. caps</td>
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<td>00954</td>
<td>GREEN TEA EXTRACT (Mega) decaffeinated, 100 veg. caps</td>
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<td>01074</td>
<td>5-HTP • 100 mg, 60 caps</td>
<td>27.95</td>
<td>0002</td>
<td>HAIR, SKIN &amp; NAIL REJUVENATION FORM W/VERISOL® • 90 tabs</td>
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<td>01738</td>
<td>HCA (Garcinia) • 90 veg. caps</td>
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<td>29754</td>
<td>HCACTIVE® GARCINIA CAMBOGIA EXTRACT • 90 caps</td>
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<td>01393</td>
<td>HEPATOPRO • 900 mg, 60 softgels</td>
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<td>00121</td>
<td>HOMOCYSTEINE RESIST • 60 veg. caps</td>
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<td>01527</td>
<td>HUPERZINE A • 200 mcg, 60 veg. caps</td>
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<td>00661</td>
<td>HYDRODERM* • 1 oz</td>
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<td>01704</td>
<td>IMMUNE MODULATOR W/TINOFEND® • 60 veg. caps</td>
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<td>00955</td>
<td>IMMUNE PROTECT W/PARACTIN® • 30 veg. caps</td>
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<td>02005</td>
<td>IMMUNE SENESCENCE PROTECTION FORMULA® • 60 veg. tabs</td>
<td>40.00</td>
<td>01674</td>
<td>INOSITOL CAPSULES • 1,000 mg, 360 veg. caps</td>
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<td>01292</td>
<td>INTEGRA-LEAN® AFRICAN MANGO IRVINGIA • 150 mg, 60 veg. caps</td>
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<td>03071</td>
<td>IONIC SODIUM • 300 mg, 2 fl. oz</td>
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<td>01677</td>
<td>IRON PROTEIN PLUS • 300 mg, 100 caps</td>
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<td>01492</td>
<td>IRVINGIA W/PHASE 3RD CALORIE CONTROL COMPLEX (Optimized African Mango) • 120 veg. caps</td>
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<td>02142</td>
<td>JARRO-DOPHILUS PROBIOTIC FOR WOMEN 30 enteric-coated veg. caps</td>
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<td>00056</td>
<td>JARRO-DOPHILUS EPS® • 60 veg. caps</td>
<td>23.95</td>
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<td>02034</td>
<td>K W/ADVANCED K2 COMPLEX (Super) • 90 softgels</td>
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<td>01600</td>
<td>KRILL HEALTHY joint FORMULA • 30 softgels</td>
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<td>01550</td>
<td>KRILL OIL (Jarrov)+ • 60 softgels</td>
<td>33.95</td>
<td>00316</td>
<td>KYOLIC® GARLIC FORMULA 102® • 200 veg. caps</td>
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<td>00789</td>
<td>KYOLIC® RESERVE • 600 mg, 120 caps</td>
<td>30.15</td>
<td>01681</td>
<td>LACTOFERIN® • 60 caps</td>
<td>44.00</td>
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SUBTOTAL OF COLUMN 5

SUBTOTAL OF COLUMN 6

JULY 2018

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS
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<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>Retail Each</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
<th>QTY Total</th>
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<tr>
<td>00451</td>
<td>MSM (Methylsulfonylmethane) • 1,000 mg, 100 caps</td>
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<td>N-ACETY-L-CYSTEINE • 600 mg, 60 veg. caps</td>
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<td>01904</td>
<td>NAD+ CELL REGENERATOR® • 100 mg, 30 veg. caps</td>
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<td>02144</td>
<td>NAD+ CELL REGENERATOR® NICOTINAMIDE RIBOSIDE 250 mg, 30 veg. caps</td>
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<td>NAD+ CELL REGENERATOR® W/RESVERATROL (Optimized) 30 veg. caps</td>
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<td>NEURO-MAG® MAGNESIUM L-TReONATE • 90 veg. caps</td>
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<td>NEURO-MAG® MAGNESIUM L-TReONATE 93.35 grams • Tropical Punch Flavor</td>
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<td>01990</td>
<td>NITROVASC w/CORDIART™ • 30 veg. caps</td>
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<td>NK CELL ACTIVATOR™ • 30 veg. tablets</td>
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<td>NO FLUSH NIACIN • 800 mg, 100 caps</td>
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<td>OLIVE LEAF VASCULAR SUPPORT w/CELYER SEED EXTRACT (Advanced) • 60 veg. caps</td>
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<td>OMEGA-3 (EPA/DHA) • 120 softgels</td>
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<td>OMEGA-3 PLUS EPA/DHA w/SESAME LIGNANS, OIVE EXTRACT, KRILL &amp; ASTAXANTHIN (SUPER®) • 120 softgels</td>
<td>45.00</td>
<td>33.75</td>
<td>31.50</td>
<td>24.75</td>
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<td>OMEGA-3 EPA/DHA w/SESAME LIGNANS &amp; OIVE EXTRACT (Super) • 120 softgels</td>
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<td>OMEGA-3 EPA/DHA w/SESAME LIGNANS &amp; OIVE EXTRACT (Super) • 240 small softgels</td>
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<td>02091</td>
<td>ONCE-DAILY HEALTH BOOSTER • 60 softgels</td>
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<td>02213</td>
<td>ONE-PER-DAY • 60 tablets</td>
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<td>ONLY TRACE MINERALS • 90 veg. caps</td>
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<td>PALMETTOGUARD® SAW PALMETTO w/BETA-SITOSTEROL 30 softgels</td>
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<td>PALMETTOGUARD® SAW PALMETTO/NETTLE ROOT w/BETA-SITOSTEROL • 60 softgels</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 454 grams powder</td>
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<td>PECTA SOL-C® MODIFIED CITRUS PECTIN • 270 veg. caps</td>
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<td>PGX® PLUS MULBERRY (WellBetX®) • 180 veg. caps</td>
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<td>POLI-T™ • 60 veg. caps</td>
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<td>00577</td>
<td>POTASSIUM IODIDE • 130 mg, 14 tabs</td>
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<td>PQO CAPS • 10 mg, 30 veg. caps</td>
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<td>PQO CAPS • 20 mg, 30 veg. caps</td>
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<td>00302</td>
<td>PREGNENOLONE • 50 mg, 100 caps</td>
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<td>00700</td>
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<td>30.00</td>
<td>22.50</td>
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SUBTOTAL OF COLUMN 7

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

JULY 2018
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<tr>
<th>ITEM No.</th>
<th>PRODUCT</th>
<th>YOUR PRICE</th>
<th>RETAIL</th>
<th>QTY</th>
<th>TOTAL</th>
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<td>QUERCETIN (optimized) • 250 mg, 60 veg. caps</td>
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<td>02190</td>
<td>PROBOST™ THYMIC PROTEIN A • 30 packets</td>
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<td>01441</td>
<td>PROGESTA-CARE* • 4 oz cream</td>
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<td>02029</td>
<td>PROSTATE FORMULA (Ultra) • 60 softgels</td>
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<td>01909</td>
<td>PROSTAPOL® (Triple strength) • 30 softgels</td>
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<td>02261</td>
<td>PROTEIN CONCENTRATE (Whey) Chocolate • 640 gram</td>
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<td>02260</td>
<td>PROTEIN CONCENTRATE (Vanilla) • 500 grams</td>
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<td>02246</td>
<td>PROTEIN ISOLATE (Advanced Whey) Vanilla • 454 grams</td>
<td>30.00</td>
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<td>02243</td>
<td>PROTEIN ISOLATE (Whey) Chocolate • 437 grams</td>
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<td>02242</td>
<td>PROTEIN ISOLATE (Vanilla) • 403 grams</td>
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<td>02127</td>
<td>PROTEIN (PLANT) COMPLETE &amp; AMINO ACID COMPLEX • 15.87 oz</td>
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<td>01812</td>
<td>PROVINAL® PURIFIED OMEGA-7 • 30 softgels</td>
<td>27.00</td>
<td>20.25</td>
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<td>01676</td>
<td>PS CAPS (Phosphatidylserine) • 100 mg, 100 veg. caps</td>
<td>54.00</td>
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<td>01209</td>
<td>PUMPKIN SEED EXTRACT (Water-soluble) • 60 caps</td>
<td>20.00</td>
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<td>01637</td>
<td>PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT 100 mg, 60 veg. caps</td>
<td>64.00</td>
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<td>01217</td>
<td>PYRIDOXAL 5'-PHOSPHATE • 100 mg, 60 veg. caps</td>
<td>22.00</td>
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**Q R**

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<th>RETAIL</th>
<th>QTY</th>
<th>TOTAL</th>
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<td>01309</td>
<td>QUERCETIN (optimized) • 250 mg, 60 veg. caps</td>
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<td>02191</td>
<td>RAINFIREST BLEND GROUND COFFEE • 12 oz. bag</td>
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<td>02172</td>
<td>RAINFIREST BLEND GROUND COFFEE Natural Mocha • 12 oz. bag</td>
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<td>RAINFIREST BLEND WHOLE BEAN COFFEE 12 oz. bag</td>
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<td>01030</td>
<td>RED YEAST RICE (Bluebonnet) • 600 mg, 60 veg. caps</td>
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<td>00905</td>
<td>REGIMINT • 60 enteric-coated caps</td>
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<td>01708</td>
<td>REISHI EXTRACT MUSHROOM COMPLEX • 60 veg. caps</td>
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<td>01448</td>
<td>REJUVENEX® BODY LOTION • 6 fl. oz</td>
<td>24.00</td>
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<td>01621</td>
<td>REJUVENEX® FACTOR FIRMING SERUM • 1.7 oz</td>
<td>65.00</td>
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<td>REJUVENEX® (ULTRA) • 2 oz</td>
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<td>00676</td>
<td>REJUVENIGHT® (ULTRA) • 2 oz</td>
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<td>01410</td>
<td>RESVERATROL W/PTEROSTILBENE • 100 mg, 60 veg. caps</td>
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<td>02230</td>
<td>RESVERATROL (Optimized) • 60 veg. caps</td>
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<td>00889</td>
<td>RHODIOLA EXTRACT • 250 mg, 60 veg. caps</td>
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<td>RIBOGEN® FRENCH OAK WOOD EXTRACT 200 mg, 30 veg. caps</td>
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<td>00972</td>
<td>(D) RIBOSE POWDER • 150 grams</td>
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<td>01473</td>
<td>(D) RIBOSE TABLETS • 100 veg. tabs</td>
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<td>01208</td>
<td>R-LIPICID ACID (Super) • 240 mg, 60 veg. caps</td>
<td>49.00</td>
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<td>009070</td>
<td>RNA CAPSULES • 500 mg, 100 caps</td>
<td>17.95</td>
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<td>01432</td>
<td>SAFFRON W/SATURAL® (optimized) • 60 veg. caps</td>
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<td>02175</td>
<td>SAMe (S-ADENOSYL-METHIONINE) 200 mg, 30 enteric coated tablets</td>
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<td>02176</td>
<td>SAMe (S-ADENOSYL-METHIONINE) 300 mg, 30 enteric coated tablets</td>
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<td>XYLITHANE MOUTHWASH • 16 oz</td>
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<td>01813</td>
<td>ZINC HIGH POTENCY • 50 mg, 90 veg. caps</td>
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<td>01561</td>
<td>ZINC LOZENGES • 60 veg. lozenges</td>
<td>9.00</td>
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<td>01961</td>
<td>ZINC LOZENGES (Enhanced) • 30 veg. lozenges</td>
<td>12.00</td>
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<td>01254</td>
<td>ZYLAMEND WHOLE BODY • 120 liquid veg. caps</td>
<td>72.95</td>
<td>54.71</td>
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</table>

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ORDER SUBTOTALS

<table>
<thead>
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<th>SUBTOTAL COLUMN 1</th>
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ORDER TOTALS

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</thead>
</table>
| POSTAGE & HANDLING (Any size order, in the U.S. includes Alaska & Hawaii) | $5.50  
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| SHIPPING |

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