Natural Methods to Enhance IMMUNE FUNCTION

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CAUTION: Individuals consuming more than 50 mcg (2000 IU) 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.
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The realization about immune senescence has been brought to the forefront by the current viral pandemic.

More serious complications and deaths occur in older persons compared to younger people with healthier immune function.

While antiviral treatments are being investigated, immune senescence remains a major impediment.

Most of you already take steps to help protect immune function by supplementing with vitamin D, vitamin C, zinc, melatonin and DHEA.

I describe in this editorial what I have personally done to maintain healthier immunity.

The article described people over age 60 who are appalled at being branded “elderly” as it relates to their immunity.

These individuals go to great lengths to prevent degenerative disease by making the right dietary choices, exercising, and even competing in triathlons. They also do not outwardly appear “elderly.”

What they don’t realize is that despite healthy lifestyles, aging is often accompanied by marked declines in immune function.

An example of these immune deficits is reactivation of the chickenpox virus that causes painful shingles outbreaks as people age past 45 years.

A more insidious impact of age-related immune impairment is a higher rate of cancer, severe influenza, and pneumonia.

In the elderly, vaccinations can fail because of inability to generate a robust antibody response.
Don’t Wait for Full-Blown Illness to Manifest

People often wait until they are very sick before seeking treatment for a flu or common cold virus. In some cases, treatment delay can be lethal.

I have found enormous personal benefit by taking aggressive action at the onset of the very first cold-flu symptom.

I take strong proactive measures when I have mild symptoms the way some people do after they have suffered days of agonizing flu virus miseries.

My strategy is to not let the virus gain a foothold inside my cells.

Up until now, my approach has succeeded: I have not suffered more than a day of significant cold or flu symptoms since January 1983.

I am going to explain my personal program, but the key point is that you should immediately address the very first symptom of a cold-flu viral infection like it is the most lethal agent you have ever encountered.

This approach may be analogized to dropping a nuclear bomb when conventional weapons might be adequate.

While some people wait until full-blown viral symptoms manifest, I don’t have that option.

Life Extension® is a 24-hour-a-day operation with no room for down time. I can’t call in sick just because a virus has invaded my body.

The box on this page describes antiviral drugs that are effective when administered soon after onset of cold/flu symptoms.

This same strategy may hold true for certain nutrients that must be initiated upon the very first symptom of a common flu or cold virus.

My immediate-attack strategy may also be important before any virus infects too many cells, though the culprit behind the current pandemic is too new to know this yet.

Unleashing the Nuclear Bomb

I maintain an intense schedule with exposure to many people, yet I have gone 37 years without suffering a serious cold-flu viral infection.

On top of that, I have genetically defective bone marrow that killed my brother at age 22 and has caused chronic illnesses in another family member.

While it would be convenient to credit the many supplements I take, it seems more likely that my success avoiding acute illness is a result of the aggressive protocol I initiate as soon as I feel that a viral infection may be taking hold.

Published scientific studies substantiate the benefit of the components of my immune-boosting regimen but there have been no clinical trials to support the efficacy of my entire protocol.

One-Pill Protection Against Common Flu Viruses

If you contract the flu this year, you might want to initiate a drug called XOFLUZA®.

This new antiviral drug is approved to treat Influenza A and Influenza B with just a single pill that costs around $150.

Some preclinical studies show XOFLUZA® is effective against certain avian viral strains like H7N9 and H5N1.2

XOFLUZA® functions via a different mechanism than Tamiflu®, which is important because some flu viruses have developed resistance to Tamiflu®.3,4

XOFLUZA® is not effective against coronavirus.

Antiviral drugs like XOFLUZA® are effective against common flu virus strains, but only when they are initiated within 24-48 hours of the manifestation of symptoms.5
I’ll discuss some of the research that supports my rationale, but here are the drugs, nutrients, and hormones I take as soon as the first symptom of common cold or flu manifests:

- **Cimetidine** (Tagamet®) – 800 mg-1,200 mg each day. This drug is sold over the counter in pharmacies to combat heartburn. It has a beneficial side effect of boosting immune function by activating natural killer cells and reducing T-suppressor cells. This helps the immune system function more efficiently.

  Cimetidine is sold over the counter, but it is wise to read the package insert in case this drug is contraindicated for you—for instance, if you have kidney problems.

  For most people, cimetidine provides a powerful immune stimulation that is particularly effective against certain viruses. The brand name of cimetidine is Tagamet®, but the generic (cimetidine) costs less.

- **High-allicin garlic extract** – 6,000 mg-9,000 mg once or twice a day. This potent form of garlic will cause painful stomach-esophageal burning if you don’t eat food right afterward. The high intake of this kind of garlic will cause you to reek of a strong sulfur odor but saturating the body with this pungent garlic is the objective. Garlic has shown direct viral-killing effects in several published studies.

- **DHEA** – 50 mg-200 mg early in the day. Doses over 25 mg a day are much higher than normal, but DHEA has shown some benefits in boosting one’s ability to mount a stronger immune response and also protecting against over-active inflammatory cytokine responses that can occur when your immune system hyper-reacts to viral infections.

- **Lactoferrin** – 300 mg-1,200 mg a day. This natural constituent of mother’s milk boosts natural killer cell activity and can prevent certain viruses from binding to cell membranes and entering the cell, where they replicate.

- **Zinc acetate lozenges** – one to two 18.5 mg lozenges every two waking hours. Please be aware that this is a very high dose of zinc and is considered toxic if taken over the long term. You should only do this for a few days. Zinc lozenges have shown a direct effect of inhibiting the ability of certain cold viruses to latch on to the cells in the back of your throat where they multiply and can descend into your lungs to potentially cause pneumonia.

- **Melatonin** – high dose of 10 mg-50 mg at bedtime. Melatonin induces a potent immune response and this high dose can facilitate the deep sleep one often needs to fend off an infection. This dose of melatonin may make you extremely tired, so please only take this before bedtime and do not operate any machinery or vehicles after ingestion.

- **Aged garlic extract** – 3,600 mg a day. There are unique immune-boosting compounds in aged garlic that work differently than those found in the high-allicin garlic. So I take both aged garlic extract and high-allicin garlic extract when I am concerned about viral infections.

- **Whey protein concentrate** – 2-4 scoops a day to provide a glutathione boost and can ramp up vital antibody responses.

I take the above doses when I develop any symptom that may signal the beginning of a flu or cold in addition to the supplements I use every day.

My daily personal program probably closely resembles what most of you do, such as taking over 5,000 IU of vitamin D3 to maintain optimal blood levels.

As you might expect, I also take high-potency multi-vitamins, CoQ10, curcumin and other plant extracts, along with several grams of vitamin C, and more.
In individuals who consumed an encapsulated **aged garlic extract**, T-cells and NK-cells showed more robust proliferation, compared to individuals who received **placebo**.

After 90 days of supplementation, illness diary entries showed that the incidence of colds and flu, a secondary outcome, were not statistically different. However, the group consuming the **aged garlic extract** was reported to have:

- Reduced severity as noted by a reduction in the number of symptoms reported (21% fewer).
- A reduction in the number of days (by 61%) and incidences (by 58%) on which the subjects functioned sub-optimally.
- A reduction in the number of work/school days missed due to illness (by 58%).

The researchers who conducted this study concluded that the results “suggest that supplementation of the diet with **aged garlic extract** may enhance immune cell function and that this may be responsible, in part, for reduced severity of colds and flu.”

For several years, manufacturers of garlic supplements debated as to which **form** (high-allicin or aged garlic) was most effective.

I have concluded, after reviewing the studies on the immune properties of garlic, that each form has unique antiviral and/or immune-enhancing properties, which is why I supplement with both forms when cold or flu symptoms manifest.

Low-cost garlic may be an effective weapon against certain viruses.
The Life-Saving Side Effect of a Heartburn Drug

Tagamet® is the brand name of what used to be the most popular drug to treat heartburn. You’ve likely seen hundreds of commercials on TV for Tagamet®.

Now that it is off patent, we refer to Tagamet® by its generic name "cimetidine."

A little-known side effect of cimetidine is that it inhibits the overproduction of T-suppressor cells.6 In doing so, it boosts immune function by preventing the immune system from prematurely turning itself down.

Cimetidine has shown other immune-modulating effects such as increasing natural killer cell activity and boosting levels of natural immune stimulants interleukin-2 and gamma interferon.31-34 Human studies demonstrate cimetidine’s efficacy against herpes and viral warts.34-38

Cimetidine is safe for most people to take on a limited basis.39 Typical antiviral doses of 800 mg-1,000 mg at night (or 200 mg three times a day and then 400 mg at night) appear to be an effective way to temporarily turn up the immune system.

Cimetidine in 200 mg tablets can be purchased over the counter at pharmacies. The directions in the over-the-counter package insert say that up to 400 mg a day is safe, but some published studies where cimetidine is used as an antiviral agent have used over 1,000 mg a day.40

Lactoferrin may stimulate macrophages, which in turn may help to induce cell-mediated immunity.42 Although many of the studies are on animals, lactoferrin is naturally present in many mucous membrane secretions in humans, suggesting an inborn human antimicrobial function.10,43

One study showed that lactoferrin inhibits viral infection by interfering with the ability of certain viruses to bind to cell receptor sites.44

This is of unique importance because many viral infections are contracted in the mucous membranes of our nasal passages and then move into our throats and lungs where they infect cells and initiate rapid proliferation.

Immune-Boosting Hormones

Dehydroepiandrosterone (DHEA) and its metabolites have demonstrated immune-enhancing and antiviral effects.45-49

The administration of 50 mg a day of DHEA to nine elderly men who had baseline DHEA levels well below those of young adults resulted in the following immune enhancements compared to placebo:50

- Increase of 29% in the number of B immune cells
- Increase of 62% in B-cell activity
- Increase of 40% in T-cell activity
- Increase of 50% in interleukin 2
- Increase of 22% to 37% in natural killer cell number
- Increase of 45% in natural killer cell activity

One reason that influenza can be lethal to aging people is that their immune systems are weakened. A deficiency in DHEA may be partially responsible for the age-related decline in immune function.51

One study showed that a metabolite of DHEA augmented activation of T-helper cells and protected mice from a lethal influenza viral infection.49

Mother’s Milk

It is well known that infants obtain protection against certain infections from components contained in mother’s milk. One such component is lactoferrin, which has documented immune-potentiating effects.41-43

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Once rhinoviruses bind to their receptor sites in the nasal tissues and begin replicating, zinc lozenges lose their efficacy. Considering how inexpensive zinc lozenges are, it makes sense to keep them in the medicine cabinet so that they are immediately available if cold symptoms manifest.

While less than 100 mg/day of zinc can improve immune function, zinc should not be consumed in amounts greater than 300 mg/day for more than a day or two, to avoid excessive zinc levels that might suppress immune function.

Lots More to Learn...

Major clinical advances have been made in fields such as cardiology, where sudden heart attack deaths plummeted 50% between the years 1980 to 2014.

The Shingrix® vaccine has been recommended to me by several...
respected doctors. So I took this vaccine at age 64 to prevent a shingles outbreak that can have immune-damaging effects by exhausting naïve T-cell populations.

**Hepatitis C** is now largely curable with several different drug options such as *Sovaldi*, which was initially priced at $1,000 per pill. To cure hepatitis C viral infections, 84 *Sovaldi* pills are usually needed plus ribavirin.

Effective treatments remain elusive for common viruses such as herpes simplex-1, herpes simplex-2, herpes zoster (shingles), Epstein-Barr, cytomegaloviruses, influenza, rhino (common cold) viruses, and the new coronavirus sweeping the world.

As of this writing, several therapies appear promising against coronaviruses, but none has been thoroughly validated.

What we do know is that younger people with healthy immune systems are less likely to suffer severe effects and death from viral infections.

A “healthy” immune system quickly recognizes a viral invader, mobilizes a coordinated attack, and then “turns off” when its work is done, to avoid damaging healthy tissues.

Failure to “turn off” an over-active immune response is a leading cause of death in elderly persons who suffer bacterial and/or viral infections.

**Combat Immune Senescence**

In this month’s issue we describe some natural approaches to improve immune function. None of what we publish should be construed as a preventative or treatment for the viral infections plaguing today’s world.

I use these immune-supporting compounds because they have demonstrated varying degrees of efficacy in peer-reviewed published studies.

My hope is to not only ward off flu infections, but also reduce my risk of cancer due to the weakened immune function caused by normal aging and genetic predisposition.

Despite being outwardly healthy, immune senescence often begins by age 50 or 60 years, making us more vulnerable to infectious diseases, malignancies and chronic inflammatory disorders.

Please know that Life Extension’s network of physician-scientists are working around the clock to identify and validate methods to rapidly regenerate immune functionality and we will provide that information to our many supporters.

As I wrote in the opening of this editorial, most of us over age 40-50 years have less-than-optimal immunity. Aggressive measures are urgently needed to restore youthful immune responses.

For longer life,

William Faloon, Co-Founder
Life Extension®

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**References**

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References
In the News

Lactoferrin Helps Fight Infectious Diseases

Lactoferrin is a glycoprotein that plays an important role in the immune system. Research has shown that lactoferrin has antiviral activity against viruses such as rotavirus, herpes, and HIV—and against respiratory viruses like respiratory syncytial virus (RSV).1

Now, research published in the Journal of Microbiology, Immunology, and Infection has found that lactoferrin can help attenuate infectious diseases.2

In this randomized, double-blind, placebo-controlled study, 290 healthy adults took either 200 mg of lactoferrin, 600 mg of lactoferrin, or a placebo for 12 weeks.

Both lactoferrin doses reduced the duration of infectious diseases (including cold sores, gastroenteritis, and styes) and the summer cold.

Editor’s Note: Lactoferrin is known to have some immunostimulatory effects such as enhancing the production of secretory immunoglobulin A (sIgA), the phagocytic capacity of neutrophils, and the cytotoxicity of natural killer (NK) cells.

References
Cancer patients who supplemented with vitamin D had improved survival rates, according to a meta-analysis reported in the *Journal of Clinical Oncology.*

For their analysis, the researchers selected 10 randomized, controlled trials that included a total of 79,055 cancer patients. Trials compared the effects on cancer incidence and mortality of at least three years of vitamin D supplementation, and with a placebo.

The analysis showed that vitamin D supplementation was associated with a 13% lower risk of dying from cancer compared with taking a placebo.

“Vitamin D had a significant effect on lowering the risk of death among those with cancer,” said coauthor Tarek Haykal, M.D. “The difference in the mortality rate between the vitamin D and placebo groups was statistically significant enough that it showed just how important it might be among the cancer population.”

*Editor’s Note:* Cancer is the second leading cause of mortality in the U.S., the authors noted.

Meta-Analysis Supports Use of Quercetin for High Blood Pressure

A meta-analysis published in *Nutrition Reviews* concluded that there is a beneficial role for quercetin supplementation in people with high blood pressure.* Quercetin is a flavonoid found in apples, onions, tea and other plant foods.

The meta-analysis included 17 trials that involved a total of 896 participants, many of whom were at risk of cardiovascular disease. Trials compared the effects of quercetin or a quercetin-rich extract to a placebo or no treatment for periods ranging from 2 to 12 weeks. In addition to blood pressure, plasma lipids and glucose and/or insulin were measured at the beginning and end of the studies.

Pooled results of 13 treatment arms revealed an association between quercetin supplementation and reduced blood pressure. Quercetin administration was associated with a **3.09 mmHg** average reduction in systolic blood pressure and a **2.86 mmHg** reduction in diastolic pressure. A decrease in triglycerides and increase in HDL cholesterol levels occurred among participants who consumed quercetin for eight or more weeks.

**Editor’s Note:** The authors concluded that, “Quercetin intake resulted in significantly decreased blood pressure in humans. Moreover, participants who consumed quercetin for eight weeks or more showed significantly changed levels of high-density lipoprotein cholesterol and triglycerides in trials with a parallel design.”

Optimism is associated with a reduced risk of cardiovascular events and all-cause mortality, according to a study published in the journal JAMA Network Open.*

Researchers conducted a meta-analysis of 15 studies, including nearly 230,000 people. They found that optimism was associated with a 35% reduced risk of cardiovascular events and a 14% reduced risk of all-cause mortality.

Cardiovascular events included fatal cardiovascular mortality, nonfatal myocardial infarction, stroke, and new-onset angina.

Editor’s Note: “Future studies should seek to better define the biobehavioral mechanisms underlying this association and evaluate the potential benefit of interventions designed to promote optimism or reduce pessimism,” the authors concluded.

*JAMA Netw Open. 2019;2(9):e1912200.
Metformin Reduces Acne in Women with Polycystic Ovarian Syndrome

Metformin reduces the severity of acne in women with polycystic ovarian syndrome (PCOS), according to a study published in the Journal of Clinical and Aesthetic Dermatology.*

PCOS is a hormonal disorder that can cause hyperandrogenism (high levels of male hormones), which can contribute to acne.

For the study, 40 women with PCOS and acne were given 500 mg of metformin three times a day for eight weeks.

The results showed that metformin significantly reduced the severity of acne in patients with PCOS by reducing ovarian hyperandrogenism.

Editor’s Note: The researchers concluded, “Our results suggest that metformin might serve as an effective therapy for ovarian hyperandrogenism and acne in women with PCOS.”

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Increase AMPK to Better Manage Body Weight

Most people today consume too many excess calories.

This results in mTOR constantly running at high gear, which is a factor in unwanted fat storage.

Studies show that increasing AMPK activity turns down excess mTOR.¹

Reduce Cell Fat Storage

Scientific studies show that increasing AMPK activity can encourage cells to store less fat and burn it as energy.²³

AMPK Metabolic Activator was formulated based on data showing reduced belly fat in response to just one of its ingredients (Gynostemma pentaphyllum).³

AMPK Metabolic Activator is a dual-nutrient formula designed to support healthy AMPK cellular activation.

References
Immune senescence underlies common diseases of aging.

Most people view weakened immunity as a risk factor for cancer and infectious disease.

A lesser-known impact of an aged immune system is inflammation caused by over-active cytokines that damage the brain, lungs, arteries and bone.

This dual impairment whereby protective immune components like naïve T-cells diminish while pro-inflammatory cytokines increase, is a hallmark of immune senescence.

Not only do we lose the ability to defend against cancers and infections, but underlying inflammation destroys our neurons, kidneys and joint cartilage.¹,²

To reverse this decline, Life Extension® has worked with scientists for decades seeking to restore youthful immune function.

We reported earlier this year on a landmark study in which the thymus gland of older people was regenerated after a one-year protocol using growth hormone, metformin, and DHEA. The participants were also given zinc and vitamin D3 supplements.

In this study, immune markers improved, and the biological age of the elderly subjects was reversed by 2.5 years!

These kinds of medical advances that Life Extension® helped support made headline news worldwide.

This immune-regenerative protocol using growth hormone, metformin, and DHEA is now moving into expanded clinical trials.

The slides on the next page highlight what I present to live audiences about this human study published in December 2019.

As we await widespread availability of better immune-boosting therapies, people are seeking natural compounds that have been shown to enhance immune functions in peer-reviewed scientific studies.

The two articles that begin on page 28 will educate readers about some of the approaches currently available that have been shown to help restore immune functionality.
PARTIAL REVERSAL OF IMMUNE SENESCENCE

Study conducted by Dr. Greg Fahy in collaboration with researchers from Stanford University and UCLA consisted of individualized doses of:

1. Human growth hormone (hGH)
2. DHEA
3. Metformin

Study subjects were also provided with daily vitamin D3 and zinc.


Cocktail of Drugs Gives First Hope That ‘Biological Age’ Can Be Reversed

Scientists at Intervene Immune and Stanford Medical Center say they have proven that ‘epigenetic aging can be reversed in humans.’

…they are optimistic that a person’s biological age can be reversed.”

Age markers reversed by 2.5 years!


“ATURNING BACK TIME!”

Aging is REVERSED in men using a cocktail of growth hormones and diabetes drugs in study that saw test group shed 2.5 biological years.”

Source: https://www.dailymail.co.uk/health/article-7435427/Aging-REVERSED-small-group-men-study-reveals.html

References
From the common cold and flu to newer threats, viral infections are a major cause of disease and death worldwide.

The protein lactoferrin has shown potent antiviral activity in preclinical and clinical (human) studies.

It attacks viruses at several points in their lifecycle, through various mechanisms.1-4

While some lactoferrin is produced in the body, it can also be absorbed from oral intake, bolstering the body’s defenses.5

The best ways to avoid viral illnesses remain the standard precautions:

- Avoid contact with sick individuals.
- Wash your hands with soap and water frequently, for at least 20 seconds.
- If soap and water aren’t available, use a hand sanitizer with at least 60% alcohol.
- Avoid touching your eyes, nose, and mouth.
- Clean and disinfect frequently touched objects and surfaces.

Lactoferrin should not replace these tried-and-true preventive measures. However, it may provide an additional layer of defense to reduce the risk of contracting viral illnesses and to diminish their severity.
How Viruses Invade

Viruses are unlike other infectious agents. For one thing, they cannot grow and reproduce on their own. They must hijack the controls of a host cell to survive and replicate. Also, they are tiny, far smaller than microscopic bacteria and fungi.  

Viruses are made up of miniscule packages of protein that surrounds genetic material. When they find a suitable host cell, they invade, then use that cell to produce new copies of the virus, which can go on to infect other cells.

The first step in this process occurs after the virus enters the body, often through the lining of respiratory airways or the digestive system. Viruses contain surface proteins that are able to recognize specific surface features of cells. This allows them to attach to cells and gain entry.

Once in the cell, the virus takes control of the cellular machinery to make copies of its genetic material and proteins that are then reassembled into new virus particles. Lactoferrin helps protect by impeding the invasion and growth of viruses at multiple steps in this process.

A Constituent of Mother’s Milk

Lactoferrin is a protein found naturally in milk. It’s also produced in other bodily secretions, including tears and saliva, and by some immune system cells.  

Lactoferrin is found in highest amounts in colostrum, the first type of mother’s milk produced after a baby is born. It has remarkable powers to shield infants from infection before their own immune systems have fully developed.

In adults, it is an important component of defenses against infections.

In mucous, saliva, and other secretions, lactoferrin helps prevent pathogens from gaining entry through the linings of the oral cavity, nasal cavity, airways, and digestive system.

One unusual feature of lactoferrin is the diversity of viruses it can shield against. It has been shown to possess robust antiviral activity against different types of virus, from those that cause the common cold and flu, to HIV and hepatitis B and C viruses.
Lactoferrin does this in two different ways:

- It **binds** to the **virus** directly, blocking the viruses' surface proteins' ability to recognize binding sites on the surface of cell membranes.
- It **binds** to surface sites on the **cell's** outer membrane that are targeted by viruses.

For example, a compound found on cell surfaces, called **heparan sulfate**, is a common target for various viruses. Several studies have shown that lactoferrin **binds** to structures containing **heparan sulfate**, which can prevent viruses from recognizing and entering the cell.7,8

### Activating the Immune System

Lactoferrin also has **indirect** antiviral effects. It helps the body fight against a virus by **activating immune defenses**.

Lactoferrin activates **natural killer** cells and increases their number.5,9 These immune cells are equipped to recognize abnormal cells, including those infected by viruses, and eliminate them. This can help prevent the spread of a virus in the body.

Lactoferrin also stimulates the production of other antiviral compounds, including the signaling proteins known as **interferons**.2,4 One of the important ways that interferons promote immunity is to signal to surrounding cells that viruses are present, and help activate antiviral mechanisms to prevent growth and spread of those viruses.

Lactoferrin may also help block the ability of viruses to **reproduce** even if they’re already inside cells.1,4 This helps limit the spread of the virus, potentially reducing the severity of the resulting illness.

### Fighting Common Viral Illnesses

Lactoferrin has been shown, in laboratory, animal, and human studies, to have potent activity against a number of viruses.1-4,7,8,10-12 This includes common viruses such as those that cause the **common cold**, the **flu**, and **gastroenteritis** (stomach flu).

There are several different types and strains of virus that cause these illnesses. Although the common cold and viral gastroenteritis are usually mild, influenza can prove deadly in young children, the elderly, and those with other health issues.

Some strains of the viruses that cause influenza are covered by annual flu vaccines, but many others are not. The extra protection afforded by lactoferrin could make a difference in helping to lessen the impact of these illnesses.

In one study, healthy women taking **oral lactoferrin** experienced a reduced onset of both common-cold-like and gastroenteritis symptoms.13 In other clinical studies, lactoferrin was effective for reducing the symptoms of viral gastroenteritis, including those caused by **rotavirus** and **norovirus**. Oral lactoferrin reduced the incidence and severity of the symptoms of these illnesses.4

People taking **100 mg** of lactoferrin six or seven days a week had an approximately **4-fold reduction** in the incidence of viral gastroenteritis compared to people who took it only once a week.4
Lactoferrin’s Other Immunity-Boosting Benefits

Lactoferrin has benefits beyond fighting viruses.

Studies have demonstrated that it can boost healthy immune function, which protects against a variety of pathogen types.

Various disease-causing bacteria have been found to be susceptible to the actions of lactoferrin.\textsuperscript{2,3}

The immune system is also important in monitoring for abnormal cells which could develop into cancer. Lactoferrin improves this ability, demonstrating potent anticancer effects in many studies.\textsuperscript{5}

Emerging Viral Threats

Coronaviruses of differing types have caused severe acute respiratory syndromes such as the SARS epidemic in Asia that killed over 700 people in 2003.\textsuperscript{14}

This same family of SARS viruses emerged this year as the cause of COVID-19.

COVID-19 is too new to have been studied in depth, but it shares many features with other coronaviruses. These include the SARS and MERS viruses that caused previous highly serious infectious disease outbreaks.

Lactoferrin shows promise in helping to defend against SARS-type coronaviruses in at least two different ways.

In a 2011 study, lactoferrin was effective at blocking a model of a SARS-type coronavirus from entering host cells.\textsuperscript{7} It did this by preventing binding of viral elements to the heparan sulfate compounds on the surface of the target cells.

Given the lack of an effective vaccine or drug treatment for so many viral illnesses, lactoferrin is a promising new tool in the defense against viral illnesses.

Summary

Lactoferrin is a protein produced in milk, saliva, and other secretions.

Laboratory, animal, and clinical research demonstrates lactoferrin’s activity against a wide range of viruses, including those that cause the common cold and flu.

It works by helping to block viral invasion of cells and by amplifying the immune system’s power to eliminate viral infection from the body.

Taken orally, lactoferrin is readily absorbed and can play an important role in bolstering defenses against viral illnesses.

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

References

Comprehensive Blood Tests at Low Lab Sale Prices

The Male and Female Panels provide more individual tests compared to their launch over 20 years ago. Yet the price is far below what commercial labs charge.

Last year we added fasting insulin to help detect glucose control issues before outward disease manifests. Excess fasting insulin can temporarily suppress blood glucose and obscure a smoldering problem that can silently damage tissues.

In 2018, we added apolipoprotein B to better assess the artery-clogging risk of circulating blood lipids like LDL. This year we’ve added a magnesium serum test to help optimize dosing of this vital mineral.

Commercial labs charge over $2,000 for the tests included in the Male and Female Panels.

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**METABOLIC PROFILE**
Glucose
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*NEW* Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
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Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
Blood proteins: albumin, globulin, total protein, albumin/globulin ratio

**CARDIAC MARKERS**
Apolipoprotein B (ApoB)
Homocysteine
C-Reactive Protein (high sensitivity)

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

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

**CANCER MARKER**
PSA (Prostate Specific Antigen)

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

**FEMALE PANEL**

**METABOLIC PROFILE**
Glucose
Insulin
Hemoglobin A1c
Serum Magnesium

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

**CARDIAC MARKERS**
Apolipoprotein B (ApoB)
Homocysteine
C-Reactive Protein (high sensitivity)

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

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

**HORMONES**
Progesterone
Estradiol (an estrogen)
Free and Total Testosterone
DHEA-S
TSH (thyroid function)
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For those already taking resveratrol, we also offer NAD+ Cell Regenerator™ that provides 300 mg of nicotinamide riboside.

The only online source of these NAD+ formulas is LifeExtension.com (or by calling 1-800-544-4440).

* For pricing available to readers of this magazine, call 1-800-544-4440 or visit LifeExtension.com/NAD
Lactoferrin, a component of whey protein, is best known for its immune benefits. New data reveal how lactoferrin turns on bone-building signals in the body. This enables better utilization of calcium, magnesium, and other skeletal structural components.

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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'-**methyltetrahydrofolate (5-MTHF)**, which is up to **7 times** **more** bioavailable than folic acid.*

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*Reference

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Whey fractions help modulate a full range of immune functions.²,³

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Melatonin has long been thought of as the “sleep hormone.” It regulates circadian rhythms, the body’s internal biological clock, which can improve sleep patterns.

That’s important for optimal health. Inadequate sleep has a well-documented negative impact on immune health, increasing susceptibility to infectious diseases and cancer.1-3

But melatonin does much more.

Melatonin provides vital support to the immune system, helping coordinate immune responses to defend against a wide variety of threats, including viruses.4-6

Internal production of melatonin drops significantly with age.6-8 This leaves the immune system weakened.

In 1992, Life Extension® introduced melatonin to the world based on evidence of its anti-aging properties, including potential to boost immune function and reduce cancer risks.
**Melatonin Regulates Immune Function**

**Melatonin** is a hormone produced primarily in the **pineal gland** of the brain. It is also produced in other tissues, including cells of the immune system.

Its best-known role is in regulating sleep-wake cycles but it has demonstrated other beneficial properties.

Two of melatonin's effects are particularly profound:

- **Supporting immune health**
- **Anti-cancer activity**

Scientists have found that melatonin sends signals to the immune system and the immune system “talks” back.

This “cross talk” fine-tunes and coordinates healthy immunity. It bolsters innate defenses that guard against a wide range of pathogens, from viruses to cancer cells.

It also improves immune attacks on specific viruses and disease-causing bacteria and parasites.

The influence of melatonin on immune health was first observed in 1926. Scientists reported that kittens fed pineal gland extracts—now known to be a major source of melatonin—gained significantly improved resistance to infections.

**Combatting Immune Senescence**

The deterioration of the immune system that comes with age is called **immune senescence**. It causes a dramatic weakening of immunity. This is a big part of the reason why the elderly are more susceptible to infectious disease from viruses, bacteria, and other pathogens.

A healthy immune system searches out and eliminates abnormalities, including senescent cells, pre-malignant cells and cancer cells.

With immune senescence, this function isn’t performed properly, and disease risks rise.

One cause of immune senescence is inadequate production of hormones that control immune function, like melatonin. In rodents, boosting melatonin levels can reverse immune senescence, rejuvenating immune function.

The effects can be seen in the **thymus gland**, which produces T cells, the “soldiers” of the immune system. As we age and the immune system declines, the thymus slowly shrinks. Immune function suffers as a result.

**But in aged mice, melatonin stimulates new growth of the degenerated thymus, producing new T cells that improve immune function.**

Melatonin counters immune senescence in other ways, including:

- Enhancing the responses of antibodies that “tag” specific viruses, bacteria, and other invaders to be attacked by different components of the immune system,
- Reducing **chronic inflammation**, a cause of nearly all age-related chronic diseases, and
- Enhancing the activity of **T cells**, helping to more efficiently destroy pathogens.

**Melatonin and Infection**

Even with healthy immunity, melatonin can strengthen immune response.

Preclinical studies have investigated the impact that melatonin has on viruses, bacteria, and parasites. It improves the immune response to infection caused by all of these.

It does so by stimulating the production and activity of cells that fight infection, including T cells and NK (natural killer) cells that eliminate virus-infected cells, along with macrophages that engulf and destroy foreign invaders.

Melatonin regulates levels of several key immune system **signaling** factors that are required for an orchestrated immune response.

Together, these effects help rid the body of infectious pathogens and keep the immune response to appropriate, safe levels, avoiding a harmful overresponse or excessive inflammation.
In animal models, melatonin protects against infections caused by viruses of various types. In severe viral brain infections, it reduces viral levels and prevents paralysis and death.

In one astonishing study, scientists exposed mice to an extremely aggressive virus called Venezuelan equine encephalomyelitis, which killed 100% of infected animals. When treated with melatonin, the mortality rate was reduced to just 16%.

Melatonin is protective in bacterial infections as well.

Bacterial infections can lead to sepsis, a life-threatening condition resulting in shock, organ failure, and death. In patients with sepsis, low nighttime melatonin levels correlate with more severe illness.

In animal models of sepsis, melatonin prevents multiple organ failure and circulatory failure. And in human newborns born with sepsis, treatment with melatonin reduces mortality.

Anticancer Effects

The immune system is one of our body’s main defenses against cancer. Natural killer (NK) cells are immune cells that identify and eliminate abnormal cells, including tumor cells and cells that are developing into cancer cells.

Melatonin augments the activity of natural killer and other immune cells, helping to rid the body of abnormal cells before they can do more damage.

Research has shown that melatonin does even more to prevent cancer, possessing many direct anticancer effects. In ways that scientists are still investigating, it fights cancer at every stage, working to prevent its initial formation, progression, and spread in the body.

In preclinical and clinical studies, melatonin has been found to suppress many forms of malignances, including:

- Breast cancer,
- Brain cancer,
- Ovarian cancer,
- Endometrial (or uterine) cancer,
- Melanoma,
- Prostate cancer, and
- Colon cancer.

Melatonin Benefits the Immune System

- **Melatonin** is a hormone long known to regulate sleep-wake cycles and improve sleep.

- The production of melatonin declines with age.

- **Life Extension** introduced melatonin in 1992 as an effective anti-aging therapy.

- Science has expanded to look beyond its role in sleep, to investigate its potential in immune function and cancer.
IMMUNE-BOOSTING EFFECTS OF MELATONIN

Summary

Melatonin isn’t just for improving sleep.
This hormone has been shown to have an impact on the immune system, fine-tuning immune responses and protecting against viral and other infections, cancer, and more.

As melatonin levels diminish with older age, immune function wanes, increasing susceptibility to disease. •

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

References

MacuGuard® Ocular Support provides:

1. **Lutein, trans-zeaxanthin, and meso-zeaxanthin** to help maintain structural integrity of the **macula** and **retina**.1-5

2. **Alpha-carotene** to further help support **macular density**.1

3. **Cyanidin-3-glucoside** to assist with night vision.6-8

4. **Astaxanthin** for comprehensive eye health support and to fight eye fatigue.9

5. **Saffron** to help support vision, based on study subjects seeing an average of two additional lines on eye chart used by doctors to test vision.1

For full product description and to order MacuGuard® Ocular Support with Saffron & Astaxanthin, call 1-800-544-4440 or visit www.LifeExtension.com

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- Vitamin K2 (MK-7) (long-acting protection) 100 mcg

**Super K Elite** provides 2 additional forms of vitamin K and even higher potencies of K1, MK4 and MK7. **Super K Elite** costs 60 cents a day and provides:

- Vitamin K1 (converts to K2 in some people) 2,000 mcg
- Vitamin K2 (MK-4) (for bone & vascular health) 1,500 mcg
- Vitamin K2 (MK-7) (long-acting protection) 181 mcg
- Vitamin K2 (MK-9) (added cardiovascular support) 43 mcg
- Vitamin K2 (MK-6) (added cardiovascular support) 11 mcg

**Super K** Item #02334 • 90 Softgels
1 bottle $22.50 • 4 bottles $20.25 each

**Super K Elite** Item #02335 • 30 Softgels
1 bottle $18 • 4 bottles $16 each

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

CAUTION: If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult with your healthcare provider before taking these products.

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Sweet DREAMS

Choose the Melatonin That’s Right For You

Healthy sleep is one of the best ways to feel revitalized and maintain optimal health.

While many people find melatonin helps improve sleep, others take it nightly for its immune protection effects.

Individual doses range from 300 mcg to 10 mg taken 30–60 minutes before going to sleep.

Caution: Consult your health care provider before taking this product if you are being treated for a medical condition (especially autoimmune or depressive disorders). Use caution if combining with alcohol. This product is not intended for children, pregnant or lactating women, or women trying to become pregnant. Do not attempt to drive or operate heavy machinery after taking this product.

Sensoril® and Capros® are patent protected and registered trademarks of Natreon, Inc. MicroActive® Melatonin is a registered trademark of Bioactives LLC. Lactium® is used under license. For occasional sleeplessness.

For full product description and to order any of these premium-grade Melatonin supplements, call 1-800-544-4440 or visit www.LifeExtension.com

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Quercetin has demonstrated significant health benefits, but higher doses are often required to achieve optimal results.

A novel phytosome delivery technology markedly increases absorption to deliver more quercetin throughout one’s body.

For daily quercetin supplementation, take just one of the new highly-absorbable Bio-Quercetin Phytosome capsules.

One small 10 mg quercetin dose of new Bio-Quercetin provides a 500 mg equivalent dose of standard quercetin!*

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Item #02302 • 30 vegetarian capsules

1 bottle $9

4 bottles $8 each

* Supplier Internal Study. Data on File. 2017
SAFE-GUARD Your Skin from Within

Unique ORAL formula provides *Polypodium leucotomos* fern extract along with nicotinamide and red orange extract.

Item # 01938 • 120 vegetarian capsules
1 bottle $33
4 bottles $30 each

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

This product is not a substitute for topical sunscreens.

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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.
Antioxidants fight oxidative damage caused by free radicals, which contributes to degenerative aging.¹⁻³

But not all antioxidants are the same.

The kinds most people know about are found in fruits, vegetables, and other external sources.

But our bodies also produce their own internal antioxidants.

One of the most important of these antioxidants is an enzyme called superoxide dismutase (SOD).

SOD levels in cells drop as we age. This leads to more oxidative tissue damage.⁴

Scientists have discovered that aronia berry extract and a melon concentrate can stimulate SOD production, offering a new way to bolster antioxidant defenses.
**Oxidative Stress**

*Free radicals* are unstable molecules with an unpaired electron. This instability leads them to steal electrons from other molecules that inflict damage to delicate cellular structures.

That damage, known as *oxidative stress*, can be outwardly felt when recovering from an alcoholic hangover. Metabolites of alcohol (such as acetaldehyde) inflict cellular damage that one can outwardly feel.

Internally, oxidative stress contributes to degradation of the body’s proteins while body fat is converted to forms that contribute to chronic inflammation.5-6

Over time, this accumulated damage accelerates pathological aging.9

**Free-Radical Formation**

*Free radicals* are inevitable facts of life.

Various outside factors can contribute to increased free-radical formation in the body—pollutants, toxins, some drugs, cigarette smoke, radiation, and more.1-3

But even if we are careful to avoid unhealthy external factors, free radicals *still* form from within.

Inflammation, infection, and stress contribute to free-radical formation. Even normal, healthy processes, such as the metabolism of nutrients to make energy, create free radicals.

With age, defenses against the damaging effects of free radicals sharply decline.1,10

**How Antioxidants Help**

Nature has provided a way to counter the danger of free radicals—*antioxidants*.9 These compounds got their name because they fight against oxidative stress. They find free radicals and neutralize them.

When cells have antioxidant defenses in place, they sustain less degenerative damage.

**Two Types of Antioxidants**

There are two general types of antioxidants.11,12

*Endogenous* antioxidants are formed *within the body*. These include superoxide dismutase (SOD), glutathione peroxidase, catalase, and glutathione.

*Exogenous* antioxidants are formed *outside the body* but can be absorbed and used by our cells if we consume them orally.

Examples include vitamins C and E, carotenoids, flavonoids, polyphenols and other plant extracts.

Although cells make their own endogenous antioxidants, external antioxidants confer additional protection.11,12

What few people understand is that *endogenous antioxidants* (like SOD) are the first line of defense, particularly against the free radicals that are formed within our cells due to everyday, normal metabolic processes.

**The Importance of Superoxide Dismutase**

One of the strongest *endogenous antioxidants* is the enzyme SOD.

A common free radical is produced in each cell’s energy-producing mitochondria. Known as *superoxide*, this compound is very unstable, meaning it seeks to grab electrons from other molecules, creating pathological havoc.

While normal oxygen is harmless, superoxide reacts aggressively with other molecules and can permanently damage them.

*Superoxide dismutase* is expressly designed to recognize superoxide radicals and convert them into water and hydrogen peroxide before they can do damage.

Other enzymes convert the hydrogen peroxide into water and oxygen.13

*Superoxide dismutase* is found throughout the body. It’s in the main compartment of every cell, in the mitochondria, and in the spaces between cells.
When superoxide dismutase levels are adequate, they offer remarkably powerful protection against free radicals and oxidative damage.

**SOD Declines with Age**

Activity of superoxide dismutase dwindles with age. Researchers measured SOD levels in individuals ranging in age from infancy to 69 years old. They found that after age 40, levels of SOD declined. This study showed that after age 40, SOD levels were on average about 20% lower than those of a 25 to 40-year-old.

**Boosting SOD Levels**

Scientists have found a way to reverse the loss of SOD, thereby increasing levels in the body. This suggests that we can protect against oxidative damage at an early stage, potentially helping to slow degenerative aging processes.

Superoxide dismutase levels in the body can be increased in two ways:

1. Some nutrients help stimulate the body’s own production of SOD.
2. An external SOD can be consumed orally to further increase bodily levels.

**Aronia Berry Stimulates SOD Production**

Aronia berries are a potent source of anthocyanins, health-promoting pigments. These anthocyanins themselves are antioxidants, helping to neutralize free radicals.

Aronia berries also have another important property: They have been shown to activate the protein Nrf2, a key regulator of antioxidant response in cells.

This ability of aronia berry to boost SOD has been shown in a human study. The trial enrolled patients with metabolic syndrome, who had lower SOD levels at the beginning of the study than the healthy controls. Subjects were given 300 mg of aronia berry extract daily. After two months, SOD levels in the body increased by 29%.

These subjects also benefited from a 52% increase in glutathione peroxidase, another important “internal” antioxidant.

**Help Fight Oxidative Stress**

- There’s no way to stop free radicals from being produced. Even our own metabolism leads to the creation of these harmful compounds, which cause oxidative stress, a major source of aging and disease.
- Superoxide dismutase (SOD) is an antioxidant produced in the body that defends against oxidative stress, particularly against superoxide, the dangerous free radical.
- Levels of SOD drop over time, increasing our vulnerability to more rapid aging and risk for disease.
- Taking aronia berry extract has been shown to boost the body’s production of SOD.
- A unique melon concentrate provides SOD directly.
- Together, these two extracts provide powerful protection against free-radical damage.
An Outside Source of SOD

Researchers have identified a melon extract high in SOD.

Animal studies have shown that taking this concentrated melon extract orally increases SOD levels in body tissues. In piglets, it led to an almost 37.5% increase in SOD activity in only 12 days.

Two trials tested the effects of the SOD-rich melon extract in people who felt daily stress and fatigue. These unhappy feelings can be associated with cellular oxidative stress.

In both trials, participants took the melon extract or a placebo and were put through a battery of tests to assess their quality of life, stress, and fatigue.

In those who took the melon extract, perceived stress scores dropped by 31% and quality-of-life scores improved by 42%, compared to baseline. Mental fatigue was reduced by 21% and physical fatigue fell by 9%, when compared to controls.

Together with aronia berry extract, this concentrated melon extract provides fuel to boost systemic SOD levels, protecting against the damage caused by oxidative stress.

Summary

Oxidative stress caused by free radicals is a source of cellular damage. It contributes to degenerative aging processes.

Antioxidants neutralize free radicals, thus mitigating the harm they inflict.

One of the most important endogenous antioxidants is the enzyme superoxide dismutase (SOD).

Its levels drop with age. But scientists have found that aronia berry extract and a melon concentrate extract can boost SOD levels.

Aronia berry stimulates the body’s own production of superoxide dismutase and other antioxidants. Melon concentrate increases cellular SOD activity directly.

References


If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.
Carnosine is a unique dipeptide that can inhibit glycation throughout the body, thereby helping to slow normal aging processes. Suggested dose is one 500 mg Carnosine cap taken twice daily.

Super Carnosine provides 500 mg of carnosine per capsule along with fat-soluble vitamin B1 (benfotiamine) to further impede glycation reactions.

Mitochondrial Energy Optimizer provides 1,000 mg of carnosine in each four-capsule dose along with R-lipoic acid, benfotiamine, taurine, and PQQ to provide broad-spectrum support.

Life Extension® was the first to introduce high-dose (500 mg) carnosine back in 1999. Life Extension carnosine is available in three different formulas to allow you to customize your longevity program.

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

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Cognitex® Elite contains clinically studied brain-boosting nutrients in one advanced formula.

A new ingredient called SIBELIUS™: Sage Extract demonstrated improvement in attention and memory performance in healthy, older volunteers.

Cognitex® Elite provides all of these ingredients:

- SIBELIUS™: Sage extract (leaf) 333 mg
- AuroraBlue® Wildcrafted 200 mg
- Blueberry Complex
- Sensoril® Ashwagandha extract 125 mg
- Phosphatidylserine 100 mg
- Uridine-5’-monophosphate 50 mg
- Vinpocetine 20 mg

Cognitex® Elite Pregnenolone contains these same powerful ingredients but with 50 mg of pregnenolone added.

Do not use if you are of childbearing age, pregnant or planning to become pregnant.

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

Item #02397 • 60 vegetarian tablets
1 bottle $43.50
4 bottles $40 each

Item #02396 • 60 vegetarian tablets
1 bottle $42
4 bottles $38 each

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Young people produce abundant quantities of an *internal* cell *antioxidant*, called SOD (superoxide dismutase).

With age, SOD production **declines**.

**SOD Booster** provides unique extracts of *aronia* and *melon* that promote the production of SOD.

---

**SOD Booster** • Item # 02361
30 vegetarian capsules

- 1 bottle $21
- 4 bottles $19 each

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Keto Brain and Body Boost is an easy-to-mix, peach-flavor powder that supplies beneficial ketones using beta-hydroxybutyrate.

It also contains mangiferin and resistant starch to support the body’s natural ability to produce ketones.

Keto Brain and Body Boost provides the brain and muscles the benefits of ketones without the drawbacks of a ketogenic diet.

Item #02318 • Net Wt. 400 g (14.1 oz.)
1 container $37.50 • 4 containers $34 each

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

The Brain & Body Element

In areas where lithium is naturally abundant in the drinking water, people tend to live longer, healthier lives.¹⁻³

Lithium is a low-cost mineral that supports cognition, neural function, and healthy aging.³⁻⁵

References

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

Lithium
(1,000 mcg of lithium per tiny cap)
Item # 02403 • 100 Vegetarian Capsules

1 bottle $12
4 bottles $10.50 each

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For nearly 30 years, scientists have been convinced that increasing magnesium levels in the brain can potentially prevent or reverse some age-related changes that contribute to cognitive decline and dementia.¹

But it’s been difficult to put this knowledge into practice, because taking more magnesium orally does not significantly raise brain levels.

A unique form of magnesium developed at the Massachusetts Institute of Technology (MIT) is changing that. Magnesium L-threonate has been shown to boost brain magnesium levels in animals when taken orally. This effect is due to its unique ability to cross the blood-brain barrier.²

Another rodent study showed that oral use of magnesium L-threonate raised brain fluid levels of magnesium by 54%.³

Brain benefits have also been shown in humans. In a clinical study of adults with cognitive impairment, magnesium L-threonate reversed measures of brain aging by 9 years.⁴
Magnesium’s Impact on the Brain

Magnesium is an essential mineral found in varying amounts in a range of plant- and animal-based foods. Throughout the body, it works as a cofactor, or “helper molecule,” required for the normal function of hundreds of enzyme systems.

In fact, magnesium is essential for about 80% of the body’s metabolic functions.6

Magnesium plays an especially critical role in the brain, where it protects the functioning of synapses, the communication connection points between brain cells.

For people to learn and form memories, synapses must have a property known as plasticity, the ability to adapt and change in response to stimuli.

Declining synaptic plasticity is a major contributor to loss of cognitive function in older age. And magnesium can help stop this decline.

How it Works

As you can see in the graphic below, brain cells release a “messenger” from most synapses, known as neurotransmitters.

Neurotransmitters bind to a receptor for the neurotransmitter on the other brain cell, thereby stimulating it.

In areas of the brain where learning and forming memories take place, the most important receptor is NMDA.6

The NMDA receptor requires an additional step to become fully activated—one that involves magnesium. Magnesium acts as a secondary activator of the NMDA receptor and is vital to the synapses’ plasticity.

Without magnesium, the NMDA receptor and the whole synapse fail to function normally.

In animal studies, researchers have demonstrated that increasing levels of magnesium in the brain increases synaptic plasticity and leads to greater synaptic density.

That means it helps existing synapses work better and also increases the overall number of synapses2,3,7-10

These effects translate into improvements in cognitive function, including better learning and memory.

Boosting Magnesium Brain Levels

Scientists at MIT developed a form of magnesium called magnesium L-threonate.

This form is more easily absorbed, or bioavailable, and results in higher levels of magnesium in the brain compared to other forms.2

In fact, oral intake of magnesium L-threonate raises brain fluid levels of magnesium in rodents by 54%. It also increases synaptic density and increases production of NMDA receptors in brain cells.3

Most importantly, several studies demonstrate that this boost to brain magnesium directly translates to improvement in mental function.
Making Rodents Smarter!

If you have a pet hamster, you might want to give it a little brain boost.

Scientists first tested magnesium L-threonate on aged rats. The results showed an enhanced ability to learn, with improvements seen in both short-term and long-term memory.²

Another study pitted magnesium L-threonate against other, common forms of magnesium, including magnesium chloride and magnesium sulphate.¹⁰ Magnesium L-threonate led to greater improvements in memory than the other forms of magnesium.

Two mouse studies specifically evaluated magnesium L-threonate in models of Alzheimer's disease, the most common cause of dementia in older adults.⁷,⁹ In both studies, it prevented the loss of synapses associated with Alzheimer's and maintained or improved memory.

Magnesium L-threonate was even effective at improving cognition in very-late-stage Alzheimer's disease.

A Groundbreaking Human Trial

A group of scientists designed a clinical study to test whether these benefits translate to people.

Adults 50-70 years old, with some level of cognitive impairment, received 1,500 mg-2,000 mg (depending on body weight) daily of magnesium L-threonate or a placebo for 12 weeks.⁴ At the end of the study, subjects who were treated with magnesium L-threonate had an improvement in overall cognitive ability.

On average, subjects started out with some degree of impairment of executive functioning, the ability to think abstractly, plan, and make decisions. By the end of the study, the executive functioning of those taking magnesium L-threonate was restored to nearly normal for their age.

At the start of the study, the participants averaged 57.8 years of age. However, their brain age based on cognitive functioning was 68.3 years old. By the end of the trial, those receiving magnesium L-threonate improved by 9 years of brain age, a truly remarkable result.

Brain Protection with Magnesium L-Threonate

- The mineral magnesium plays a critical role in the brain, protecting the function of synapses involved in complex cognitive processes such as learning and memory.
- Inadequate magnesium intake is very common, yet most magnesium isn’t absorbed well by the body and can’t enter the brain in sufficient amounts.
- Scientists at MIT developed a new form of magnesium called magnesium L-threonate, which is highly absorbable and has been shown to increase brain levels of magnesium to a much higher degree than other forms.
- Studies in animals and humans show that magnesium L-threonate improves and maintains cognitive function, even in older individuals with prior signs of cognitive decline.
- In one human study, it reversed cognitive measures of brain aging by 9 years.
Summary

Magnesium is a critically important mineral required for the function of hundreds of enzymes in the human body, making it essential for nearly 80% of our metabolic reactions.

In the brain, magnesium is needed for the proper functioning of synapses involved in complex tasks such as learning and memory.

A large majority of the population suffers from inadequate magnesium intake. Because most magnesium supplements are poorly absorbed and do not enter the brain in sufficient quantities, fixing this problem has been difficult.

An improved type of magnesium is finally changing that.

Magnesium L-threonate is easily absorbed and taken up into the brain, providing cognitive benefits as shown by animal and human studies.

This form of magnesium offers tremendous promise to aging people seeking to maximize their neurological potential.

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

Getting Enough Magnesium

Most people don’t get nearly enough magnesium from their diet.

In the U.S., approximately 65% of all adults have below optimal intake of magnesium.11,12 That number gets even higher in older age, with more than 80% of people over 71 consuming inadequate amounts of magnesium.

Over time, this leads to magnesium deficiency, which contributes to many chronic conditions including cardiovascular disease and age-related loss of cognitive function.11,12 Fortunately, supplementation with magnesium L-threonate can resolve magnesium deficiency and contribute to improved health and longevity.

References

Natural killer cell activity declines with normal aging, which can affect immune function.

NK Cell Activator™ supports healthy natural killer cell activity to promote a robust immune response.¹⁻³

Functional NK cells also recognize and eliminate senescent cells that accumulate in aged tissues.

The standardized plant extract in NK Cell Activator™ supports the activity of natural killer (NK) cells.

Clinical Studies

In one clinical study, scientists documented a 3-fold increase of natural killer cell activity in healthy individuals within three to four weeks of receiving 500 mg daily of the rice bran compound found in NK Cell Activator™. In another double-blind, randomized, placebo-controlled study, researchers noted that subjects taking the rice-bran compound found in NK Cell Activator™ experienced a boost in myeloid dendritic cells—cells that act as key messengers between the innate and the adaptive immune systems.⁴

The suggested single serving of one vegetarian tablet of NK Cell Activator™ provides:

| Proprietary Enzymatically Modified Rice Bran | 500 mg |

Contains wheat.

References

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

Item #01903 • 30 vegetarian tablets
1 bottle $33.75
4 bottles $31.50 each

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AT FANTASTICALLY DISCOUNTED PRICES!

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.

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.

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

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Restore Connections Between Your Neurons

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

The numbers of synapses that connect brain cells decline with aging.

Magnesium L-Threonate has been shown to improve synaptic density and other structural components of the brain.*


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Clinical trials demonstrate that the plant extracts in once-daily ArthroMax® Elite help:

• Support a healthy inflammatory response
• Maintain healthy connective cartilage tissue
• Promote comfortable joint function

Take advantage of the benefits of Mobile-Ease™ Chinese skullcap, cutch tree and white mulberry TODAY!

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BOOST AND PROTECT YOUR VASCULAR HEALTH

Optimal heart health depends on many factors including proper functioning of the endothelium—the thin layer of cells lining the interior of the entire circulatory system.

TRIPLE-ACTION PROTECTION

Endothelial Defense™ with Pomegranate Complete contains three unique ingredients shown to support endothelial health.

1. Pomegranate Complete provides potent polyphenols scientifically shown to support healthy blood flow.

2. Superoxide dismutase (SOD) supports healthy arterial function and boosts the body's protective enzymes.


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

Caution: Do not take this product if you are allergic to wheat or gluten.

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Isocell SA, France is the owner of US Patents Nos. 6,045,809 and 6,426,068B1 and trademark of GliSODin®.

Item #02097 • 60 softgels
1 bottle $51 • 4 bottles $46.50 each

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Topical Collagen Helps Restore Youthful Skin

BY ROBERT GOLDFADEN AND GARY GOLDFADEN, MD

Replenishing depleted collagen levels is one of the first steps to revitalize aging skin.

Many commercial topical creams target type I collagen.

Overlooked is the role of other collagen types in rebuilding the skin’s scaffolding.

A topical formula featuring three peptides has been shown to synthesize all major collagen types in the dermis and dermo-epidermal junction.

By providing total collagen support, these peptides can visibly improve skin firmness and smoothness, while producing long-lasting anti-wrinkle effects.
What Causes Collagen Loss?

Aging decreases the synthesis of collagen fibers in the dermis, and causes existing collagen fibers to become disorganized, stiff, and fragmented.\textsuperscript{10,11}

Decreased production of non-fibrillar collagens also contributes to skin aging.\textsuperscript{12-15}

The unfavorable effects of aging on skin tissue are exacerbated by chronic exposure to sunlight and air pollution.

These environmental factors generate inflammation and oxidative stress that trigger activation of collagen-destroying enzymes known as matrix metalloproteinases (MMPs).\textsuperscript{16-19}

The end results are wrinkles, fine lines, dryness, and saggy skin.

Many topical products focus only on type I collagen without recognizing the significance of other collagen types in restoring youthful skin integrity and function.

That is why scientists developed three unique peptides that renew all major collagen types to rejuvenate aged and damaged skin.

**Palmitoyl Tripeptide-5**

Peptides are compounds composed of amino acids, which form the building blocks of proteins in our skin, including collagen.\textsuperscript{20}

A group of peptides has been shown to activate growth factors that promote youthful collagen synthesis.\textsuperscript{20,21}

An in-vitro study found that one of these growth peptides called palmitoyl tripeptide-5, along with another peptide:\textsuperscript{22}

- Increased type I collagen by 110%
- Increased type III collagen by 40%
- Increased type IV collagen by 190%
- Increased type VII collagen by 60%
- Increased type XVII collagen by 120%

These findings have translated into impressive real-world benefits.

In a clinical study, topical application of palmitoyl tripeptide-5, twice daily for two months, increased skin firmness by 10.8% compared to a placebo.\textsuperscript{22}

Researchers investigated the efficacy of palmitoyl tripeptide-5 in diminishing fine lines and wrinkles.
Collagen Peptides Restore Youthful Skin

- Collagen is essential for skin firmness, cohesion, and resilience.
- Fibrillar collagens (Type I and III) form rope-like fibers in the dermis that supply high-tensile strength, whereas non-fibrillar collagens (Type IV, VII, and XVII) self-assemble a scaffolding network in the dermo-epidermal junction that tightly connects the dermis to the epidermis above it.
- Aging and chronic exposure to external factors like sunlight and air pollution reduce the synthesis of collagen and increase its degradation to set the foundation for wrinkles, fine lines, and sagging skin.
- Many topical products only target type I collagen and overlook the significant impact of other major collagen types in rebuilding the skin’s scaffolding.
- A new topical formula has been developed with a trio of unique peptides—palmitoyl tripeptide-5, palmitoyl tripeptide-1, and palmitoyl tetrapeptide-7—shown to regenerate all major collagen types in the dermis and dermo-epidermal junction.
- Controlled human studies show that these peptides provide total collagen care to reconstruct the dermis and reinforce the dermo-epidermal junction, which improves firmness, smoothness, and erases wrinkles to restore a youthful appearance.

Participants who applied a topical formulation with palmitoyl tripeptide-5 experienced a reduction in fine lines by **20%** and in deep wrinkles by approximately **28% within minutes** of initial application. These parameters further improved to about **38%** and **50%**, respectively, after three months.\(^{21}\)

Researchers concluded that this topical treatment containing palmitoyl tripeptide-5 was “well tolerated and provided both immediate and long-term improvements in the appearance of fine lines and wrinkles.”\(^{20}\)

**Palmitoyl Tripeptide-1 and Palmitoyl Tetrapeptide-7**

During the aging process, specialized cells known as fibroblasts become less active and produce lower levels of collagen than in youth.\(^{23}\)

Two peptides—palmitoyl tripeptide-1 and palmitoyl tetrapeptide-7—have been shown to breathe new life into aging fibroblasts.

These peptides were shown to increase production of collagen types I, IV, VII, and XVII.\(^{24}\)

By stimulating dermal regeneration and strengthening the dermo-epidermal junction, these peptides can drop years off the outer appearance of skin.

This was demonstrated in a clinical study involving 23 females between the ages of 42 to 67 who topically applied a combination of these peptides to one half of the face and a placebo to the opposite side.\(^{24}\)
TOPICAL COLLAGEN HELPS RESTORE YOUTHFUL SKIN

By day 60, researchers observed the following improvements:24

- 39.4% decrease in area occupied by deep wrinkles
- 32.9% decrease in wrinkle density
- 19.9% decrease in main wrinkle depth
- 23.3% decrease in main wrinkle volume
- 16.0% decrease in roughness
- 16.2% decrease in complexity

An assessment of skin tone and elasticity showed improvements of 15.5% and 5.5%, respectively, during the same time frame.24

Summary

With advancing age, your skin progressively loses collagen, and this is compounded by increased exposure to external damaging factors.

Depletion of collagen weakens the skin’s underlying support structure, contributing to wrinkles, sagging, and creping.

A novel, topical formula has been developed with three unique peptides—palmitoyl tripeptide-5, palmitoyl tetrapeptide-1, and palmitoyl tetrapeptide-7—shown to replenish all the major collagen types in the dermis and dermo-epidermal junction.

By providing total collagen care, these peptides help correct structural changes in aging skin to boost firmness and smoothness, erase wrinkles, and restore a youthful appearance.

References

YOUR BONE HEALTH ... NOW BOOSTED

Bone Restore with Vitamin K2 combines skeletal-strengthening nutrients in one highly absorbable formula.

For full product description and to order Bone Restore with Vitamin K2, call 1-800-544-4440 or visit LifeExtension.com

Note: Those taking the anticoagulant drug Coumadin® (warfarin) should use Bone Restore without vitamin K2.

Fruitex B® and OsteoBoron® are registered trademarks of VDF Futureceuticals, Inc. U.S. patent #5,962,049. DimaCal® and TRAACS® are registered trademarks of Albion Laboratories, Inc., U.S. patent 6,706,904.

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.
Super Omega-3 provides higher EPA/DHA potencies PLUS olive oil polyphenols and sesame lignans to extend the stability of DHA in the blood.

**BEST SELLING SUPER OMEGA-3 FORMULA**

Item #01982 • 120 softgels

<table>
<thead>
<tr>
<th>1 bottle</th>
<th>$24</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 bottles</td>
<td>$21 each</td>
</tr>
</tbody>
</table>

For full product description and to order Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract, call 1-800-544-4440 or visit www.LifeExtension.com

IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc. These products have been tested to the quality and purity standards of the IFOS™ program conducted at Nutrasource Diagnostics, Inc. Dosage and Use

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.
FOR A MORE YOUTHFUL APPEARANCE...

Boost Skin’s Collagen Production

Collagen Boosting Peptide Cream reduces the appearance of wrinkles, softens and smooths skin, and enhances skin firmness by supporting collagen renewal.

Unlike other topicals, it contains three unique peptides—shown to replenish all major collagen types that support youthful skin.

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

Item #80176 • Net Wt. 2 Oz. (60 g)
1 jar $36.75 • 4 jars $31.50 each
Life Extension® first introduced SAMe in 1997. Since then, researchers around the world have continued to discover its impressive benefits.

While SAMe is largely known for mood support, it has also shown benefits for the liver and joints.

A study by Harvard Medical School and Massachusetts General Hospital cited the impressive benefits of SAMe for mood elevation.1

A report published in Germany showed that SAMe may help maintain healthy neurological function. This impressive report found that SAMe:2

- Increased glutathione levels by 50% and glutathione enzyme activity by 115%,
- Decreased a measurement of free radical activity by 46%, and
- Inhibited lipid peroxidation by 55% in culture.

In addition to these findings, SAMe also improves brain cell methylation, thereby facilitating youthful DNA enzymatic actions, which may help account for SAMe’s mood-boosting properties. These enzymatic reactions are required for the healthy conversion of neurotransmitters such as serotonin and dopamine.

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

References

 Item #02176
400 mg, 30 enteric coated tablets
1 box $27 • 4 boxes $24 each

(SAMe is also available in boxes containing 30 200 mg tablets. Price is $18.75. If you buy four, the price is reduced to $16.50 per box. Item #02175).

CAUTION: SAMe should not be taken by those diagnosed with bipolar disorder.

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.
Fish Oil

Prevents Heart Disease by Reducing Adhesion Molecules

BY STEPHANIE CLARK

There is evidence that omega-3 fatty acids can reduce adhesion molecules and the buildup of plaque they cause.

Fish oil has been extensively studied to determine how it may prevent cardiovascular diseases.

That beneficial effect is often attributed to the ability of omega-3s to reduce inflammation, which drives the formation of artery-clogging plaque.

Other cardioprotective effects of fish oil include lowering of triglycerides and reduced platelet aggregation that can otherwise block a coronary or cerebral artery.

Heart disease and strokes, however, have another major underlying cause: adhesion molecules.

These are tiny Velcro-like barbs present on endothelial cells and on the surface of circulating white blood cells. They are a critical initiator of atherosclerosis.¹,²

A recent review reports on clinical studies showing that omega-3s (EPA and DHA) in fish oil can reduce adhesion molecules by up to 28%.

This is another way that fish oil functions to curtail atherosclerosis and lower heart disease and stroke risk.²
How Adhesion Molecules Form Plaque

**Endothelial** cells line the inside of all blood vessels, including the arteries. **Adhesion molecules** on endothelial cells and on white blood cells promote atherosclerosis.\(^1,3\)

Adhesion molecules are like tiny barbs on the surface of those cells, making white blood cells stick to the blood vessel lining.\(^1,2,4\)

This adhering of white blood cells to a blood vessel sets in motion the process of arterial plaque formation. The consequences are blood flow blockage and acute rupture of unstable arterial plaques.\(^2\)

Efforts to reduce adhesion molecule production have become a topic in cardiovascular disease prevention research.

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### Fish Oil Reduces Adhesion Molecules

There is evidence that **omega-3 fatty acids** can reduce adhesion molecules and the buildup of plaque they cause.\(^2,3\)

A meta-analysis of 18 randomized, controlled, human trials found significant reductions in adhesion molecules in subjects who supplemented with omega-3s.\(^5\)

And a recent review found reductions in adhesion molecules of up to 28% in people taking fish oil or its omega-3 constituents, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid).\(^2\)

Doses in this report ranged as high as 4,000 mg EPA and 3,500 mg DHA per day.

### Multiple Effects of Omega-3s

Lab studies of human endothelial cells in culture show the impact of omega-3 fatty acids on adhesion molecules:

- **Omega-3s**, particularly EPA, lower the production of inflammatory cytokines and adhesion molecules. This can stop white blood cells from sticking to artery walls.\(^6,7\)
- **DHA**, an omega-3 also found in fish, significantly reduces cell adhesion in response to the inflammation-promoting cytokine tumor necrosis factor-alpha (TNF-alpha).\(^8\)
- **Maresin 1** is formed from DHA and has anti-inflammatory properties. It reduces the secretion of inflammatory cytokines and adhesion molecules.

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It also reduces stress on the cell that can lead to premature cell death.\(^9\) **Maresins** have such robust cell-protective, anti-inflammatory, and pro-healing properties that they’re being explored as drugs.\(^10-12\)

Animal studies confirm the importance of these findings:

- **Hamsters** given EPA and DHA-rich fish oil had up to a six-fold reduction in white blood cells “sticking” to small artery walls.\(^13,14\)
- In mouse aortas treated with fish oil, reductions in atherosclerosis were accompanied by significant decreases in adhesion molecules that lead to the progression of plaque.\(^15\)
- **Hamsters** taking fish oil had significantly less vessel damage during ischemia and reperfusion. These terms (ischemia and reperfusion) refer to the loss of blood flow that occurs during a heart attack or stroke and the impact of sudden restoration of circulation that occurs when a stent is inserted or a blood clot dissolved or mechanically removed from an occluded artery. Fish oil’s ability to suppress the release of adhesion molecules was an important contributor to this beneficial effect.\(^14\)
- **Mice** given fish oil had significantly reduced early atherosclerotic plaque, as a result of sharp reductions in molecules that promote the release of inflammatory cytokines and adhesion molecules.\(^16\)
Summary

Adhesion molecules are produced on white blood cells and the cells lining our arteries when they are stressed. They act like tiny barbs of Velcro that attach to each other and initiate atherosclerotic plaque formation and create further inflammation-driven dysfunction.

Reducing amounts and function of adhesion molecules is a major goal of modern cardiovascular medicine. Studies reveal that daily intake of omega-3 fatty acids from fish oil reduces adhesion molecules, preventing the sticky, white blood cell/blood vessel interaction, and permitting smoother flow of blood.

This reduced adhesion molecule production is associated with reductions in early atherosclerotic plaque and lower risk of cardiovascular disease.

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-884-3027.

References

Maintain Endothelial Plaque Stability with

**ARTERIAL PROTECT**

**Arterial Protect** can help stabilize endothelial plaque and promote healthy blood flow throughout the body.*

Just one capsule a day provides the patented French Maritime pine bark extract used in clinical studies along with Gotu Kola.

**Item #02004** • 30 vegetarian capsules

- 1 bottle $33
- 4 bottles $29 each

**Reference**


Pycnogenol® and Centellicum® are registered trademarks of Horphag Research and the use of this product is protected by international patents.

For full product description and to order **Arterial Protect**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.*
A ginger-like root extract found in Male Vascular Sexual Support promotes blood flow and supports sexual response. Each capsule provides 100 mg of KaempMax™, which is super-standardized Kaempferia parviflora.

For full product description and to order Male Vascular Sexual Support, call 1-800-544-4440 or visit www.LifeExtension.com
HIGHLY PURIFIED FISH OIL

In addition to purified fish oil, Super Omega-3 provides olive oil polyphenols and sesame lignans to extend the stability of DHA in the blood.

HIGHLY-CONCENTRATED EPA/DHA + SESAME LIGNANS + OLIVE POLYPHENOLS:

SUPER OMEGA-3 Fish oil
EPA/DHA fish oil, sesame lignans and olive extract (Small, Easy-to-Swallow softgels)

Item # 01986 • 240 Easy-to-Swallow softgels*
1 bottle $24
4 bottles $21 each

Item # 01988 • 120 softgels
1 bottle $33.75
4 bottles $31.50 each

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

* Highest Independent 5-star rating, International Fish Oil Society For Over Nine Years. IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc.
Advances in Microbiome and Toxic Chemical Testing

BY DR. SHANTI ALBANI AND DR. SCOTT FOGLE

We’re hearing a great deal about the state of our gut microbiome and our exposure to toxic chemicals. Life Extension® recently spoke with Dr. Shanti Albani and Dr. Scott Fogle about new tests that help us understand both—and about what steps can be taken to correct any problems.

Check Your Gut Health

Study after study has shown that the makeup of our gut microbiota—the bacteria and other microbes living in the large intestine—has tremendous influence on both gastrointestinal issues and overall health. Life Extension® offers one of the most comprehensive gastrointestinal tests ever developed, which offers insight into a patient’s microbiome, and much more.

In this interview, Dr. Shanti Albani explains how it works and what it offers.

LE: What can you tell us about this new gastrointestinal (GI) test?

Dr. Albani: The GI360™ Profile is named for the 360-degree, detailed picture of gastrointestinal health it provides. The test looks at microbial balance, identifies pathogens, and includes multiple markers of gastrointestinal function, inflammation, and integrity. It provides more quality information than any test I have seen before.
LE: Is this test for people with intestinal issues or a wider range of individuals?

Dr. Albani: This test is for everyone. Hippocrates said, “All disease begins in the gut,” and now, more than 2,000 years later, research is proving that to be true. The bacteria in our intestines influence our mood, weight, and cardiovascular and liver health. Our gut microbiota shape how our immune system behaves in response to toxins, food, and pathogens, which influences our likelihood of an autoimmune disease or allergies. Our gut bacteria make chemicals, including neurotransmitters, which impact us for better or worse. I have seen cases where chronic brain fog only lifted after testing and favorably modulating the gut microbiota.

LE: What exactly does this test reveal?

Dr. Albani: One of the most fascinating components of the GI360™ Profile is the microbiome abundance and diversity testing. That tells you which major groupings of bacteria are occupying your intestines. It includes both a high-level view of the balance between the six main groups, or phyla, of bacteria, and detailed identification of individual species of bacteria. Profiling the phyla tells you if your bacterial pattern matches those of healthy people or is more reflective of the unbalanced bacterial patterns associated with intestinal symptoms, obesity, or other health concerns.

LE: What makes this test different from others on the market?

Dr. Albani: For one, it’s extremely accurate. The test uses sophisticated DNA probes to identify intestinal microbes according to their DNA fingerprint. This bacterial profiling has been used in over 20 clinical trials and has been clinically verified to separate individuals with an imbalanced, or dysbiotic, gut flora from those with a healthy one.

Also, other gut microbiota tests will often just provide a list of bacteria without any context, leaving the person baffled about what the information means. The GI360™ Profile results include information on the health impact of microbial imbalances and potential actions to shift the gut microbiota toward a more balanced state.

Microbiome Abundance and Diversity Summary

The abundance and diversity of gastrointestinal bacteria provide an indication of gastrointestinal health, and gut microbial imbalances can contribute to dysbiosis and other chronic disease states. The GI360™ Profile is a gut microbiota DNA analysis tool that identifies and characterizes more than 45 targeted analytes across six phyla using PCR and compares the patient results to a characterized normobiotic reference population. The web chart illustrates the degree to which an individual’s microbiome profile deviates from normobiosis.

Legend

The web image shows the relative diversity and balance among bacteria belonging to the six primary phyla. The white shaded area represents the patient’s results compared to a normobiotic reference population. The center of the web represents less abundance while the outer edges represent more than normobiotic.
Inflammation is a driver of chronic disease and aging. The GI360™ Profile includes three markers of intestinal inflammation—and one marker of intestinal immune function, secretory immunoglobulin A (sIgA). The inflammatory markers can both identify inflammation and help distinguish its cause. For example, an elevation in all three intestinal inflammation markers would be expected in ulcerative colitis and Crohn’s disease, but if only lysozyme is elevated, it is more indicative of an intestinal infection.

**LE:** Does the test look for pathogenic bacteria as well?

**Dr. Albani:** Of course. The next section of the test focuses on GI pathogens. It uses microbial DNA probes to detect 14 pathogens, including villains like rotavirus, Salmonella, Shigella, Clostridium difficile, and Giardia. Anyone with acute intestinal symptoms or ongoing intestinal distress should be looking to rule these problem-causers out.

**LE:** Can it detect parasites?

**Dr. Albani:** Yes. The GI360™ Profile includes a microscopic stool examination. This examines the stool for parasite larva, eggs, or adults. The highly experienced lab techs who perform these tests can detect protozoa, tapeworms, flukes, roundworms, and yeast by looking at the stool under the microscope. You would be surprised how many people have unwelcome travelers in their intestines!

**LE:** Yeast like Candida can cause fungal infections. Does the GI360™ Profile screen for that?

**Dr. Albani:** It does. The test includes a bacterial and yeast culture, which is the gold standard for detecting intestinal bacterial and yeast overgrowth. The lab we partner with uses advanced culture techniques, with 10 different growing conditions instead of the three used by most labs, along with a yeast culture able to detect over 170 species of yeast and 80 species of Candida. Candida and yeast overgrowth is a common concern associated with bloating, fatigue, and brain fog.

The culture also features a sensitivity section. That means if an unwanted microbe is identified, the lab provides information about its sensitivity to various antibiotics and to natural agents. That gives individuals and their healthcare providers treatment flexibility and greater confidence that a treatment will be effective.

**LE:** Does the test measure anything else?

**Dr. Albani:** The last section of the GI360™ Profile is stool chemistries. This looks at a broad range of markers to evaluate digestive capacity, intestinal immune function, and intestinal inflammation. Our digestive system should efficiently extract nutrients and calories from the food we eat. Stool that tests positive for carbohydrates, fat, or too many muscle and vegetable fibers can indicate a lack of digestive power. In addition, stool should have adequate amounts of the pancreatic enzyme elastase. If elastase is low, it can indicate that your pancreas is not producing adequate enzymes to optimally digest food.

**Inflammation is a driver of chronic disease and aging.** The GI360™ Profile includes three markers of intestinal inflammation—and one marker of intestinal immune function, secretory immunoglobulin A (sIgA). The inflammatory markers can both identify inflammation and help distinguish its cause. For example, an elevation in all three intestinal inflammation markers would be expected in ulcerative colitis and Crohn’s disease, but if only lysozyme is elevated, it is more indicative of an intestinal infection.

**LE:** That sounds incredibly thorough. Is there anything else the stool chemistries section reveals?

**Dr. Albani:** It shows levels of a unique marker called β-glucuronidase. High levels of β-glucuronidase may be associated with an imbalanced intestinal microbiota, as well as higher circulating estrogen in premenopausal women and potentially less efficient toxin elimination. Given that we now live in a world saturated with pollutants, this marker can help us determine if our gut microbiota is working well enough when it comes to detoxification.

**LE:** What steps can someone take if the GI360™ Profile raises concerns?

**Dr. Albani:** Anything marked as abnormal is commented on at the end of the results report so individuals are not left in the dark about its
Phthalates: plastic additives used in vinyl flooring, raincoats, nail polish, and body-care products.

Parabens: preservatives used in cosmetics, body products, foods, and medications.

Methyl tert-butyl ether (MTBE): a gasoline additive inhaled from gasoline or car exhaust fumes.

LE: How are people exposed to these chemicals in the first place?

Dr. Fogle: They are ubiquitous in the environment nowadays. Here are the most common sources of these toxins:

- **Xylene:** an additive in gasoline which is also used to produce solvents, fragrances, coatings, and paints.
- **Toluene:** an additive used in nylon and plastics that is also found in gasoline, coatings, paints, synthetic fragrance, adhesives, inks, and cleaners.
- **Trimethylbenzene:** a petroleum-based additive that may be found in gasoline, paints, and cleaners, and also in contaminated groundwater.
- **Styrene:** an additive used in plastics, fiberglass, rubber, and latex found in insulation, packing materials, printer ink and toner cartridges, household objects, car exhaust, and cigarette smoke.

LE: Who is at risk from these chemical toxins?

Dr. Fogle: All of us. Even healthy people will become sick if exposed to excessively high amounts of these chemicals. We are, in a sense, filters and air purifiers for the environment around us. We accumulate toxins, and there is a theory that once the body is saturated with chemicals beyond its ability to cope or detoxify them, the toxins start affecting our health. Everyone can benefit from getting their toxin levels checked.
The most susceptible people are those who have inherited low-activity forms of detoxification enzymes, those with poor nutrition or poor nutrient absorption due to gastrointestinal issues, or those suffering from existing chronic inflammatory or autoimmune conditions. It may be especially important for these people to monitor and reduce their exposures to toxic chemicals.

**LE:** What can people do if they have high toxin levels?

**Dr. Fogle:** There are many approaches that can help with detox. Exercise is often vital. Sweating can help—but make sure to shower right after or you can start absorbing the toxins right back in through the skin. Infrared saunas also helpful. Consume **2-3 liters** of clean water daily. It is also important to consume fresh, organic fruit and veggies. They contain nutrients that support our liver’s ability to detox.

**LE:** Are there nutrients people can take directly that also support detoxification?

**Dr. Fogle:** Yes. My all-time favorite is **glutathione**. I think of it as a bodyguard that grabs a toxin, binds to it, and escorts it out of the body. **Lipoic acid** is another of my top choices, because it can function as an antioxidant in both a water and fat environment, which means it can work in every cell. The amino acid **glycine** is also needed for detox, as are the minerals **magnesium** and **selenium** and vitamins **E** and **C**. **Sulforaphane**, which is found in broccoli sprouts, also activates detoxification enzymes.

**LE:** Does gastrointestinal health play a role in healthy detox?

**Dr. Fogle:** Yes, it is critical for good detoxification. The longer stools stay inside you, the more chance you have of reabsorbing some of the toxins your body works so hard to get rid of. It is best to have two or three bowel movements a day if actively detoxing. Probiotics can be essential to help with this. •

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

Specialized Pro-Resolving Mediators (SPMs) support a healthy relationship with inflammatory factors for whole-body health.

SPMs help:

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- **RESTORE**: Help balance cytokines in the body.
- **RENEW**: Promote the regeneration of healthy tissues.

Specialized Pro-Resolving Mediators (SPMs) are derived from polyunsaturated fatty acids found in highly refined, marine-oil concentrate.

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

Item #02223 - 30 softgels

1 bottle $21

4 bottles $19 each

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.
Maintaining healthy blood sugar levels is essential for whole-body health.

**Benfotiamine** promotes healthy brain function\(^1\) supporting healthy blood sugar metabolism and protects brain health.\(^2\)

**References**

Item #00925 • 120 vegetarian capsules
1 bottle $22.50
4 bottles $20.25 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Super R-Lipoic Acid is more bioavailable, stable, and potent, achieving 10-30 times higher peak blood levels. This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes of supplementation.

Suggested dose is one to two capsules daily.

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

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NEW PROBIOTIC BLEND FOR EVEN BETTER INTESTINAL HEALTH

FORTIFY YOUR INTESTINAL FLORA

FLORASSIST® GI with Phage Technology now provides seven strains of probiotics plus four types of phages in one daily dual encapsulated vegetarian capsule.

For full product description and to order FLORASSIST® GI with Phage Technology, call 1-800-544-4440 or visit www.LifeExtension.com

Item #02125 • 30 liquid vegetarian capsules
1 bottle $24.75
4 bottles $22.50 each

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**ACTIVE LIFESTYLE & FITNESS**

- 01529 Creatine Capsules
- 02318 Keto Brain and Body Boost
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- 02023 Tart Cherry with CherryPURE®
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- 02147 Wellness Bar-Cookie Dough
- 02246 Wellness Code® Advanced Whey Protein Isolate Vanilla
- 02221 Wellness Code® Muscle Strength & Restore Formula
- 02127 Wellness Code® Plant Protein Complete & Amino Acid Complex
- 02261 Wellness Code® Whey Protein Concentrate Chocolate
- 02260 Wellness Code® Whey Protein Concentrate Vanilla
- 02243 Wellness Code® Whey Protein Isolate Chocolate
- 02242 Wellness Code® Whey Protein Isolate Vanilla
- 02220 Wellness Shake - Chocolate
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- 00038 Arginine Ornithine Powder
- 01253 Branched Chain Amino Acids
- 01829 Carnosine
- 01671 D-L-Phenylalanine Capsules
- 01624 L-Arginine Caps
- 01532 L-Carnitine
- 00345 L-Glutamine
- 01141 L-Glutamine Powder
- 01678 L-Lysine
- 00133 L-Taurine Powder
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- 02004 Arterial Protect
- 07000 Blood Pressure Monitor Arm Cuff
- 07004 Blood Pressure Monitor Digital Wrist Cuff
- 02097 Endothelial Defense™ Pomegranate Complete
- 00997 Endothelial Defense™ with GlGSDOin®
- 02320 NitroVasc™ Boost
- 00984 Optimal BP Management
- 01953 Pomegranate Complete
- 00956 Pomegranate Fruit Extract
- 02024 Triple Action Blood Pressure AM/PM
- 02102 VenoFlow™

**BONE HEALTH**

- 01726 Bone Restore
- 02123 Bone Restore-Sugar-Free
- 01727 Bone Restore with Vitamin K2
- 01725 Bone Strength Collagen Formula
- 00313 Bone-Up™
- 01963 Calcium Citrate with Vitamin D
- 01506 Dr. Strum's Intensive Bone Formula
- 01476 Strontium Caps

**BRAIN HEALTH**

- 01524 Acetyl-L-Carnitine
- 01974 Acetyl-L-Carnitine Arginate
- 01008 Blast™
- 01659 Citicoline® (CDP-Choline)
- 02321 Cognitex® Basics
- 02396 Cognitex® Elite
- 02397 Cognitex® Elite Pregnenolone
- 01540 DMAE Bitartrate (dimethylaminoethanol)
- 02006 Dopa-Mind™
- 02212 Focus Tea™
- 01658 Ginkgo Biloba Certified Extract™
- 01527 Huperzine A
- 00020 Lecithin Granules
- 02101 Memory Protect
- 00709 Migra-Eez™
- 01603 Neuro-Mag® Magnesium L-Threonate Caps
- 02032 Neuro-Mag® Magnesium L-Threonate Powder
- 00888 Optimized Ashwagandha Extract
- 01676 PS (Phosphatidylserine) Caps
- 01327 Vinpocetine

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- 01359 Cho-Less™
- 01910 CHOL-Support™
- 01030 Red Yeast Rice
- 01304 Theaflavins Standardized Extract
- 00372 Vitamin B3 Niacin Capsules

**DIGESTION SUPPORT**

- 53348 Betaine HCl
- 54160 Black Vinegar
- 30747 Digest RC®
- 07136 Effervescent Vitamin C - Magnesium Crystals
- 02021 Enhanced Super Digestive Enzymes
- 02022 Enhanced Super Digestive Enzymes and Probiotics
- 02033 EsophaCool™
- 01737 Esophageal Guardian
- 01706 Extraordinary Enzymes
- 02100 Gastro-Ease™
- 01122 Ginger Force™
- 00605 Regimint
- 01386 TruFiber®

**ENERGY MANAGEMENT**

- 01628 Adrenal Energy Formula • 60 veg capsules
- 01630 Adrenal Energy Formula • 120 veg capsules
- 01805 Asian Energy Boost
- 00972 D-Ribose Powder
- 01473 D-Ribose Tablets
- 01900 Energy Renew
- 01544 Forskolin
- 00668 Metabolic Advantage Thyroid Formula™
- 01869 Mitochondrial Basics with PQQ
- 01868 Mitochondrial Energy Optimizer with PQQ
- 01904 NAD+ Cell Regenerator™ - 100 mg, 30 veg capsules
- 02344 NAD+ Cell Regenerator™ Nicotinamide Riboside
- 300 mg, 30 veg capsules
- 02348 Optimized NAD+ Cell Regenerator™ and Resveratrol
- 01500 PQQ Caps • 10 mg
- 01647 PQQ Caps • 20 mg
- 00889 Rhodiola Extract
- 02003 Triple Action Thyroid

**EYE HEALTH**

- 01923 Astaxanthin with Phospholipids
- 00893 Brite Eyes III
- 02323 Digital Eye Support
- 01514 Eye Pressure Support with Mirtogenol®
- 01992 MacuGuard® Ocular Support with Saffron
- 01993 MacuGuard® Ocular Support with Saffron & Astaxanthin
- 01873 Standardized European Bilberry Extract
- 01918 Tear Support with MaquiBright®

**FISH OIL & OMEGAS**

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- 00463 Flaxseed Oil
- 01937 Mega EPA/DHA
- 02218 Mega GLA Sesame Lignans
- 01983 Super Omega-3 EPA/DHA Fish Oil,
  Sesame Lignans & Olive Extract
01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels
01985 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 enteric coated softgels
01984 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 enteric coated softgels
01986 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 240 softgels
01812 Provina® Purified Omega-7
01640 Vegetarian DHA

**PRODUCTS**

**FOOD**
02008 California Estate Extra Virgin Olive Oil
02170 Rainforest Blend Decaf Ground Coffee
02169 Rainforest Blend Ground Coffee
02171 Rainforest Blend Whole Bean Coffee
00438 Stevia™ Organic Liquid Sweetener
00432 Stevia™ Sweetener

**GLUCOSE MANAGEMENT**
01503 CinSulin® with InSea® and Crominex® 3+
01620 CoffeeGenic® Green Coffee Extract
02122 Glycemic Guard™
00925 Mega Benfotiamine
01803 Tri Sugar Shield®

**HEART HEALTH**
01066 Aspirin (Enteric Coated)
01842 BioActive Folate & Vitamin B12 Caps
01700 Cardio Peak™ with Standardized Hawthorn and Arjuna
02121 Homocysteine Resist
02018 Optimized Carnitine
01949 Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 50 mg, 60 softgels
01951 Super-Absorbable CoQ10 Ubiquinone with d-Limonene • 100 mg, 60 softgels
01929 Super Ubiquinol CoQ10
01427 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 30 softgels
01425 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 50 mg, 100 softgels
01437 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 30 softgels
01426 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 100 mg, 60 softgels
01431 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ • 200 mg, 30 softgels
01733 Super Ubiquinol CoQ10 with PQQ
01859 TMG Liquid Capsules
00349 TMG Powder

**HORMONE BALANCE**
00454 DHEA (Dehydroepiandrosterone) • 15 mg, 100 capsules
00335 DHEA (Dehydroepiandrosterone) • 25 mg, 100 capsules
00882 DHEA (Dehydroepiandrosterone) • 50 mg, 60 capsules
00607 DHEA (Dehydroepiandrosterone) • 25 mg, 100 tablets (dissolve in mouth)
01689 DHEA (Dehydroepiandrosterone) • 100 mg, 60 veg capsules
02368 Optimized Broccoli and Cruciferous Blend
00302 Pregnenolone • 50 mg, 100 capsules
00700 Pregnenolone • 100 mg, 100 capsules
01468 Triple Action Cruciferous Vegetable Extract
01469 Triple Action Cruciferous Vegetable Extract with Resveratrol

**IMMUNE SUPPORT**
00681 AHCC®
02302 Bio-Quercetin
01961 Enhanced Zinc Lozenges
01704 Immune Modulator with Tinofend®
00955 Immune Protect with PARA CTIN®
02005 Immune Senescence Protection Formula™
29727 Kinoko® Gold AHCC
24404 Kinoko® Platinum AHCC
00316 Kyolic® Garlic Formula 102
00789 Kyolic® Reserve
01681 Lactoferrin (Apolactoferrin) Caps
01903 NK Cell Activator™
01394 Optimized Garlic
01309 Optimized Quercetin
01811 Peony Immune
00525 ProBoost Thymic Protein A
01708 Reishi Extract Mushroom Complex
01906 Standardized Cistanche
13685 Ten Mushroom Formula™
01097 Ultra Soy Extract
01561 Zinc Lozenges

**INFLAMMATION MANAGEMENT**
01639 5-LOX Inhibitor with AprèsFlex®
02324 Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
01709 Black Cumin Seed Oil
02310 Black Cumin Seed Oil and Curcumin Elite™ Turmeric Extract
00202 Boswella
02467 Curcumin Elite™ Turmeric Extract • 30 veg capsules
02407 Curcumin Elite™ Turmeric Extract • 60 veg capsules
01804 Cytokine Supressor® with EGCG
02223 Pro-Resolving Mediators
00318 Serraflazyme
01203 Specially-Coated Bromelain
01254 Zyflamend™ Whole Body

**JOINT SUPPORT**
02404 Arthro-Immune Joint Support
02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
01617 ArthroMax® with Theaflavins & AprèsFlex®
02138 ArthroMax® Elite
00965 Fast-Acting Joint Formula
00522 Glucosamine/Chondroitin Capsules
01600 Krill Healthy Joint Formula
01050 Krill Oil
00451 MSM (Methylsulfonylemethane)
02231 NT2 Collagen™

**KIDNEY & BLADDER SUPPORT**
00862 Cran-Max® Cranberry Whole Fruit Concentrate
01424 Optimized Cran-Max® with Ellirose™
01921 Uric Acid Control
01209 Water-Soluble Pumpkin Seed Extract

**LIVER HEALTH & DETOXIFICATION**
02240 Anti-Alcohol HepatoProtection Complex
01651 Calcium D-Glucarate
00550 Chlorella
01571 Chlorophyllin
01922 European Milk Thistle • 60 softgels
01925 European Milk Thistle • 120 softgels
01522 Milk Thistle • 60 veg capsules
02402 FLORASSIST® Liver Restore™
01541 Glutathione, Cysteine & C
01393 HepatoPro
01608 Liver Efficiency Formula
01534 N-Acetyl-L-Cysteine
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### WEIGHT MANAGEMENT & BODY COMPOSITION

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<td>7-Keto® DHEA Metabolite - 25 mg, 100 capsules</td>
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<td>02479</td>
<td>7-Keto® DHEA Metabolite - 100 mg, 60 veg capsules</td>
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<td>01509</td>
<td>Advanced Anti-Adipocyte Formula</td>
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<td>01807</td>
<td>Advanced Appetite Suppress</td>
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<td>02207</td>
<td>AMPK Metabolic Activator</td>
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<td>01823</td>
<td>CalReduce Selective Fat Binder</td>
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<td>02478</td>
<td>DHEA Complete</td>
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<td>01738</td>
<td>Garcinia HCA</td>
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<td>01292</td>
<td>Integra-Lean®</td>
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<td>01908</td>
<td>Mediterranean Trim with Sinetrol™ -XPur</td>
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<td>01492</td>
<td>Optimized Irvingia with Phase 3™ Calorie Control Complex</td>
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<td>01432</td>
<td>Optimized Saffron with Satiereal®</td>
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<td>00818</td>
<td>Super CLA Blend with Sesame Lignans</td>
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<td>01902</td>
<td>Waist-Line Control™</td>
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<td>02151</td>
<td>Wellness Code® Appetite Control</td>
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### WOMEN'S HEALTH

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<tr>
<th>Code</th>
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<tr>
<td>01942</td>
<td>Breast Health Formula</td>
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<td>01626</td>
<td>Enhanced Sex for Women 50+</td>
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<td>01894</td>
<td>Estrogen for Women</td>
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<td>01064</td>
<td>Femmenessence MacaPause®</td>
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<td>Menopause 731™</td>
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<td>02319</td>
<td>Prenatal Advantage</td>
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<td>01441</td>
<td>Progesta-Care®</td>
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<td>01649</td>
<td>Super-Absorbable Soy Isoflavones</td>
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</table>
Maintain Youthful
HOMOCYSTEINE LEVELS
FOR BRAIN, HEART, AND HEARING HEALTH

Homocysteine Resist supports healthy levels of homocysteine, an unfavorable amino acid that can increase with normal aging.

Just one daily capsule of Homocysteine Resist provides:

- 5-MTHF (activated folate) 5,000 mcg
- Methylcobalamin (activated vitamin B12) 1,000 mcg
- Pyridoxal 5’-phosphate (activated vitamin B6) 100 mg
- Riboflavin (vitamin B2) 25 mg

Suggested dose: If your daily multi-vitamin contains activated B-vitamins, then take one capsule daily of Homocysteine Resist at a different time of the day.

Item #02121 • 60 vegetarian capsules
1 bottle $19.50
4 bottles $17.50 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Ultra Prostate Formula can help:
- Support healthy urination
- Promote healthy prostate size and function
- Encourage healthy inflammatory response
- Help inhibit PSA activity

“Thanks, Ultra Prostate Formula.”

Item #02029 • 60 softgels
1 bottle $28.50
4 bottles $26.25 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
7 A COMPREHENSIVE APPROACH TO HEALTHY IMMUNITY
In this editorial, Bill Faloon describes his personal antiviral protocol that has worked for the past 37 years.

26 NATURAL METHODS TO ENHANCE IMMUNE FUNCTION
Life Extension® has been supporting scientists seeking better ways to combat immune senescence, while restoring more youthful immune function today.

28 LACTOFERRIN HELPS PROTECT AGAINST VIRUSES
Lactoferrin works by impeding viral binding to cell membranes, while activating immune defenses.

38 IMMUNE-BOOSTING EFFECTS OF MELATONIN
As melatonin levels diminish with age, immune function declines. Boosting melatonin levels can rejuvenate certain immune functions.

48 BOOST INTERNAL ANTIOXIDANT DEFENSES
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58 MAGNESIUM RESTORES SYNAPTIC BRAIN STRUCTURE
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