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References

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How to Reverse Markers of Prostate Cancer

Prostate cancer will be diagnosed in more than 180,000 American men this year. About 26,000 will die from metastatic disease that originates in the prostate gland.¹

The prostate-specific antigen (PSA) blood test enables early detection that leads to higher cure rates.²

Despite prostate cancer being the second leading cause of cancer mortality in American men,¹ there has been a raging debate as to whether screening for the PSA should be done.²

An argument against screening for PSA is that it can result in overtreatment and complications that would not occur had the man remained blissfully ignorant that he may harbor a prostate malignancy.

Our rebuttal is that early detection is saving thousands of American men agonizing deaths from metastatic prostate cancer each year.

The debate over PSA screening is mercifully turning in a more rational direction. This is occurring because of improvements in the quality of management of patients with low-grade prostate cancer in the United States.

Even more exciting are new findings that show substantial reductions in prostate cancer incidence, progression, and mortality in response to healthier lifestyle choices. This means that it’s never too late to proactively protect against this malignancy that impacts so many men.

In this issue of Life Extension®, we describe novel curative procedures along with natural methods to prevent and reverse low-grade prostate disease.
In 2005, the results of a small study were released that showed that markers of prostate cancer were reversed in patients with clinically relevant disease who made comprehensive lifestyle changes. Such changes included eating a diet low in fat, but rich in fruits and vegetables, along with regular exercise. The findings showed that in the control group, PSA levels increased indicating progression (worsening) of their disease. In the comprehensive lifestyle change group, PSA levels decreased, indicating a probable regression of their prostate malignancies. Those who complied most with the healthy lifestyle changes had the greatest reductions in PSA blood levels.

Most interesting from this same study was a finding that took blood serum from the participants and added it to a petri dish of dividing human prostate cancer cells. Recall both groups consisted of men with clinically relevant prostate cancer. The control group's serum inhibited tumor growth by 9%, whereas serum from the comprehensive lifestyle group inhibited tumor growth an astounding 70%.

This discovery indicates that healthy lifestyle choices result in the blood of a prostate cancer patient gaining powers that impede tumor growth.

This 2005 study was conducted by Dean Ornish, MD, and colleagues who speculated that the healthy lifestyles they advocated to reverse coronary artery disease might also help reverse prostate cancer.

This latter speculation should come as no surprise because the factors associated with health do not distinguish between heart disease and cancer, and in fact, the very same factors are implicated in all aspects of inflammation and aging. This is the integrative nature of health versus disease.

Expanding on This Pioneering Research

Over the past three years, an avalanche of new human research reveals which dietary constituents and lifestyle interventions increase or decrease prostate cancer risk.

For those with low-grade prostate cancer, this new data provides dietary guidelines that may enable one to control their disease with active surveillance, which is a more contemporary way of saying what used to be called “watchful waiting.”

Dr. Dean Ornish advocated an across-the-board very low-fat diet that was difficult to comply with. Newer studies are showing it is the type of fat one eats that dictates risk of dying from prostate cancer.

In a 2015 published study, a group of 926 men with nonmetastatic prostate cancer were evaluated over a median 10-year period. The diets of these men were categorized either as a “Prudent” pattern (characterized by a higher intake of vegetables, fruits, fish, legumes, and whole grains) or as a “Western” pattern (characterized by a higher intake of processed foods and red meats, as well as high-fat dairy products and refined grains).

In these 926 men with clinically diagnosed prostate cancer, those who consumed the “Western” pattern diet had a 2.53-fold increase in prostate cancer-specific mortality. This was especially evident for men who consumed the most saturated fat compared to polyunsaturated vegetable fats.

Secondary analysis of the data by the same group of researchers found that men who consumed more than three servings of dairy foods daily had a 76% higher all-cause mortality risk and 141% higher prostate cancer-specific risk compared to men who consumed less than one serving a day of dairy food.

These studies clearly showed higher mortality (death rates) in prostate cancer patients who consumed unhealthy “Western” pattern diets. It went further to show that higher intake of dairy foods increased risk of dying even more in men already diagnosed with prostate cancer.
These recent and robust studies provide intriguing evidence that one’s diet has a tremendous impact on whether prostate cancer turns lethal and further validates the importance of annual PSA screening.

If a blood test shows a high or rising PSA level, this provides an early-warning indicator for a man to improve his diet and make other changes that are associated with reduced PSA and reduced mortality.

Equally important is the fact that a high or rising PSA level might require additional diagnostic tests as it could relate to a growing or metastasizing prostate cancer.

**Blood Levels of Specific Nutrients Correlate with PSA Levels**

Whether one is diagnosed with prostate cancer or worried about a steadily rising PSA, the objective is to get the PSA blood level down.

A study published in 2015 evaluated levels of carotenoids and vitamin E in the blood of men with recurring prostate cancer as evidenced by rising PSA. These were men who were previously treated with surgery or radiation but had recurring disease based on steadily elevating PSA blood levels.

After three months, men with higher blood levels of lutein and zeaxanthin showed lower PSA results. After six months, men with higher blood levels of vitamin E, lycopene, and cryptoxanthin had lower PSA readings.

The researchers who conducted this study concluded that “…greater intake of foods containing these micronutrients might be beneficial to men with PSA-defined PrCa [prostate cancer] recurrence.”

A 2014 study looked at men with recurring prostate cancer in relationship to their folate intake. The overall findings showed no relationship between folate intake and cancer recurrence. A secondary analysis of the data, however, looked at men initially treated by radical prostatectomy (surgical removal of prostate gland). In this surgery-treated group, those with the lowest intake of folate from foods and supplements had a 2.6-fold increase in the risk of cancer recurrence. In patients treated with external beam radiation and radioactive seed implantation (brachytherapy), there was no evidence of an association between prostate cancer progression and increased folate intake.

A 2013 study on men with recurrent disease after radical prostatectomy showed that higher serum (blood) levels of folate was independently associated with a 58% reduced risk of biochemical recurrence (as measured by PSA analysis).

The take-home lesson from these recent studies is the urgent need for those with prostate cancer to follow healthy eating patterns and those who wish to avoid contracting the disease to do the same.

**Most Aging Men Have Cancer Cells in Their Prostate Gland**

The prostate gland is especially vulnerable to malignant transformation, yet the vast majority of aging men that harbor prostate cancer cells never develop clinically relevant disease. Unlike more virulent cancers, there are a number of natural barriers that enable prostate tumors to be contained within the prostate gland. Some of these barriers include nutrients, hormones, drugs, and dietary factors that influence the ability of prostate cancer cells to survive and propagate.

Any aging individual with a PSA reading over 1.0 ng/mL should be concerned that they may have an early-stage prostate issue that can respond to lifestyle/dietary alterations.

With the availability of low-cost blood testing, one can easily check their PSA level three months after initiating healthier lifestyle patterns to see if they are achieving a reduction in this biomarker (PSA) of potential prostate cancer activity.

What’s interesting is that the same healthy lifestyle patterns that reduce prostate cancer risk, reduce prostate cancer progression, and reduce prostate cancer death also have been shown to reduce risk of overall mortality.
Studies Strongly Link Diet to Prostate Cancer

A wealth of published data strongly and consistently links what a man eats to his future risk of developing prostate cancer.

A study published in 2015 looked at men residing in rural Pakistan and found that frequent consumption of red meat and fat increased prostate cancer risk 3.4-fold.

This same study showed that greater consumption of vegetables, fruit, and fluids decreased prostate cancer risk by 79% to 91%.

Another study published in 2015 looked at vitamin E intake in a large group of men. Compared to the highest versus lowest dietary intakes of alpha tocopherol, there was a 66% decreased risk of developing prostate cancer. When gamma tocopherol intake was evaluated, there was a 55% decreased risk in the highest versus lowest group.

A study published in 2014 looked at the dietary patterns of Iranian men and found a strong protective effect against prostate cancer in response to higher intakes of fruits and vegetables. Men in the highest intake range of plant foods like cabbage, tomatoes, apples, and pomegranate had a 67% reduced prostate cancer risk.

A study of Italian men published in 2014 looked at dietary patterns and their association with a man’s odds of developing prostate cancer. Men who ate the most animal products or starchy foods had a 1.5-fold increased rate of prostate cancer. Men whose diets contained the most vitamins and fiber had a 7% decreased risk.

These recent studies emanating from around the world consistently show substantial prostate cancer risk reductions in response to healthy dietary practices.

Role of Obesity in Prostate Cancer Progression

Heavier men are at greater risk for benign and malignant prostate disease.

A study published in 2014 evaluated 565 men who were undergoing active surveillance for prostate cancer. Of this group, 124 were obese (body mass index [BMI] higher than 30 kg/m²).13

A follow-up finding showed that each 5-unit increase in the body mass index score was associated with a 1.5-fold increased risk of pathologic progression and 1.4-fold increased risk of therapeutic progression in these men with clinically relevant prostate cancer.

In the Patient Summary of this study, the authors concluded:

“Our study is the first to suggest that obesity is associated with a higher risk of cancer progression while on AS [active surveillance]. Further research is needed to determine if diet and exercise can decrease the risk of cancer progression while on AS [active surveillance].”13

The association between obesity and prostate cancer is well documented in the literature showing that men with the highest body mass index scores have the highest risk for advanced prostate cancer.14

The connection between obesity and low grade-chronic inflammation is partly to blame, providing a window of opportunity to reduce such risk through dietary changes. And this is precisely what was seen on a recent study by the British Journal of Nutrition. Researchers measured the “dietary inflammatory index” to predict the risk of prostate cancer. The results showed that men in the two highest dietary inflammatory index quartiles had a 32% increased risk compared to men in the lowest inflammatory index quartile.15

Why PSA Testing Is so Critical

If an elevated PSA reading meant that a man had to endure painful biopsies and other side effect-prone procedures, then it would be easier to accept the argument that aging men might choose to remain ignorant about the status of their prostate gland.
The stark reality, however, is that a friendly early warning in the form of a higher-than-desired PSA level provides an aging male with the ability to adjust his lifestyle in a manner that may potentially reverse the course of the disease, and in the process, reduce his overall mortality risk.

It is difficult for most men (including me) to consistently follow healthy eating patterns. Yet in response to an early warning sign (such as rising PSA), men will often turn around their lifestyle for the better.

When men call Life Extension® asking about a rising PSA blood level, we often suggest comprehensive intervention be implemented along with active surveillance.

The objective is to make healthy lifestyle choices and ingest compounds that help circumvent every route that enables tumor cells to propagate and escape confinement within the prostate gland.

**My Personal Triumph**

When I was 48 years old, my PSA blood reading jumped to 1.4 ng/mL.

My reaction was nothing short of controlled panic. I had seen too many men's PSA level increase to over 1.0 ng/mL and then steadily surge above 4.0 ng/mL in just a few years. At that point, some of these men had metastatic disease, while others were cured but left with impotence, incontinence, and chronic pain from treatment.

I made a personal commitment of not letting a prostate malignancy get the better of me. My reaction was to treat this PSA reading of 1.4 ng/mL as an early-warning sign that I had prostate cancer that required curative nontoxic treatment.

I adopted healthier dietary choices and initiated high doses of every nutrient and drug that had shown efficacy against prostate cancer. At age 61, my PSA is a low 0.3 ng/mL—a 79% reduction from 12 years ago.

Despite having a family history of prostate cancer, I’ve been able to keep my PSA level low by following sensible (but by no means perfect) dietary patterns and ensuring that I don’t miss taking nutrients, hormones, and drugs shown to reduce prostate cancer risk and reverse its progression.

PSA levels naturally rise with aging, yet there are a myriad of ways to control it. So far you’ve read mostly about foods that have been found to increase or decrease one’s odds of contracting and dying from prostate cancer.

The sidebar on the next page provides a partial list of individual nutrients shown to lower PSA and/or reduce prostate cancer risk and progression.

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**Prostate Cancer Deaths Sharply Higher in United Kingdom**

A British man diagnosed with prostate cancer is at least twice as likely to die of the disease as an American is. One study found men in the United Kingdom were six times more likely to die over a five-year period.71,72

There are a number of reasons for this, but the factor that most stands out is lack of national PSA screening in Britain compared to the United States.

Prostate cancer mortality (death) rates peaked in the early 1990s at almost identical rates in both countries until year 1994, when PSA screening was launched in the United States but not in Britain.

Death rates from prostate cancer declined four times more in the United States compared to Britain in the years that coincided with higher PSA screening in the United States. Patients aged 75 or older
in the United States saw the largest and longest-lasting decline in mortality.73,74

These sharply higher prostate cancer death rates in Britain are even more striking when one realizes there are five times more men of African descent in the United States compared to Britain.

The incidence of prostate cancer in men of African descent is far higher, as is its aggressiveness. This means there should be a higher rate of Americans dying of prostate cancer than the British. Since the advent of widespread PSA testing, however, prostate cancer mortality has plummeted in the United States, but remained stubbornly high in Britain.

There are other factors causing so many more British men to perish from prostate cancer including a socialized medical system that often delays treating prostate cancer until painful bone metastasis develop. This is especially the case with elderly men who are most vulnerable to the adverse impact of rationed health care.

The sad reality, however, is that the failure of the British system relating to screening and early treatment results in 49% of British prostate cancer victims dying within five years compared to less than 9% in the United States.72

To put this in further perspective, prostate cancer is diagnosed in 47,300 men every year in Britain and there are around 10,800 deaths per year from the disease.75 In the United States, about 180,000 men are diagnosed with prostate cancer (approximately four times as many) and only 26,120 die of it.1 Based on a population ratio calculation, a far higher percentage of diagnosed British men die of prostate cancer compared to their American counterparts.

Nutrients That Interfere with Prostate Cancer Development and Progression

There are a number of mechanisms by which healthy prostate cells develop mutations that transform into malignancies that progress on to clinically relevant prostate cancer.

The good news is that many of the nutrients already used by health-conscious individuals have been shown to interfere with these oncogenic mechanisms as evidenced by an abundance of peer-reviewed published studies.

Some of these readily available nutrients include:

- **Cruciferous vegetables and/or extracts**16-21
- **Fish oil**22-26
- **Curcumin**27-32
- **Boswellia**33-35
- **Lycopene**36-42
- **Green tea**43-47
- **Lignans (from flax or Norway spruce)**48-50
- **Boron**51-53
- **Lutein**54,55
- **Gamma tocopherol**56-58
- **Zeaxanthin**6,42,54,55
- **Vitamin D**59-65

In addition to the nutrients listed above, concrete steps should be taken to activate AMPK enzyme activity in prostate cells in order to reduce their potential to transform into malignancy.66-69 The antidiabetic drug **metformin** is now being studied as a potential prostate cancer therapy. Several nutrients that activate AMPK have demonstrated similar properties to metformin.70

Those with rising PSA levels should consider higher doses of nutrients and drugs that have demonstrated prostate protective effects and then test their PSA levels within three months.
The fact that there is a debate about the value of widespread PSA screening is ludicrous in light of these striking differences in survival rates between Britain and the United States.

**Looming Prostate Cancer Epidemic**

We are in the midst of a lifesaving technology going in reverse. The consequence will be thousands of needless deaths from metastatic prostate cancer. Our federal government has taken a vehement stand against PSA screening. So much so that physicians may be financially penalized if they prescribe a PSA blood test to a healthy man.

The initial results are that far fewer men are being diagnosed with prostate cancer. This does not mean prostate cancer incidence is dropping. It only means that fewer early-stage curable and/or manageable prostate cancers are being detected.

The impact of this decrease in PSA screening will be an explosion of metastatic (advanced) prostate cancer cases in the coming years, just the way it was in the days preceding the introduction of the PSA blood test.

None of this has to happen. Newer imaging procedures, along with precision cryoablation techniques, can facilitate the diagnosis and eradication of early-stage prostate cancers. A fascinating article about a more advanced prostate cancer treatment option is described in this month’s issue.

In cases of low-risk prostate cancer diagnosed early, men can be educated about diet, lifestyle changes, and ways to diminish exposure to factors that cancer depends upon for growth, invasion and metastasis. This method is best termed proactive integrative care. This means that not every diagnosis of prostate cancer equates with surgery, radiation, or other forms of side-effect prone treatment.

**Reawakening to Value of PSA Screening**

Aging males have been lulled into a false sense of security when it comes to prostate cancer risk. They are hearing that annual PSA screening is no longer deemed necessary by our medical “authorities.”

Despite this edict, low-cost PSA blood tests remain available to enlightened individuals. Those who understand how to rationally utilize

**When Medical Technology Goes in Reverse**

Most people think that innovation moves forward at a rational pace because the benefits are so obvious.

The reality is that new concepts in medicine are slow to gain acceptance and in some cases go in reverse! An average lag time from new concept to implementation is in the order of 10 to 20 years!

This happened with cardiopulmonary resuscitation. In 1767, a few civic-minded citizens in Amsterdam discovered that drowned persons could be revived if manual resuscitation techniques were applied. The technology of bringing dead people back to life spread rapidly, but then came to a virtual halt for illogical reasons, including Mary Shelly’s Frankenstein book that caused ignorant masses to become resistant to reanimating “dead” persons.

It was not until the 1960s that the United States adopted modern cardiopulmonary resuscitation to be used in hospitals, and then 20 more years before ambulances began incorporating these life-restoring procedures.

The same scenario is being played out today with regards to the need for PSA screening.

Millions of aging men are harboring prostate cancer cells and will not know it until they are diagnosed with symptoms such as urinary obstruction, painful bone metastasis, or other indicators of advanced disease. PSA screening affords huge protection against the most common malignancy that strikes aging males.
the results can successfully intervene in response to any evidence of pathology uncovered by a PSA test.

Unlike most malignancies, prostate cancer is usually responsive to early- and later-stage interventions including lifestyle change and hormone modulation.

Improved rates of successful treatment of low-grade prostate cancers have led researchers at the University of California-San Francisco to conclude that prior arguments against widespread PSA screening are now less compelling. More physicians today recognize that many early-stage prostate cancers don’t require aggressive treatment to effectively manage the disease.

This was reinforced in articles published late last year in the Journal of the American Medical Association (November 17, 2015) showing that discontinuing PSA screening will result in a sharp increase in prostate cancer death rates that may not become symptomatically apparent until year 2022. These articles also describe improved methods of active surveillance in response to rising PSA levels.

What both sides overlook is that many prostate cancers are reversible in response to lifestyle changes and nontoxic approaches. This means that men can take charge now to reduce risk, even if they have not yet developed a clinically relevant prostate malignancy.

If a man with reversible disease is to initiate these natural approaches, he should first assess the health of his prostate gland, which is why annual PSA blood testing starting at age 40 is so critical. And if there is a family history of prostate cancer, as well as a family history of other cancers that increases a man’s risk of prostate cancer, such as breast cancer and/or colorectal cancer, then the PSA testing should begin at age 35.

You have read in this article about human clinical findings showing robust reductions in prostate cancer risk and improved treatment outcomes in response to healthier living patterns. This indicates a logical recipe utilizing safe and natural approaches in response to a rising PSA level.

Annual Blood Test Super Sale

Most Americans delay getting lab tests until after outward symptoms of serious disease develop.

The reasons for blood test deferrals include not knowing which tests to order, difficulty in finding a physician to prescribe proper blood tests, inability to access blood test results, and lack of affordability.

Life Extension® resolved these problems 20 years ago by offering comprehensive blood test panels direct to health-conscious consumers at low prices with quick turnaround times, free access to health advisors to review results, and convenient drawing time usually with no appointment needed.

Every year on April 1, we announce our Blood Test Super Sale that slashes the price of our comprehensive panels by 50%.

This annual event prompts health-conscious consumers to order our Male or Female Blood Test Panels to identify health problems in time to take corrective actions.

A description of these popular blood test panels appears on the next page. Our Male Panel includes the PSA test that we consider critical for all men over age 40.

To order these tests at savings of 50%, call 1-800-208-3444.

For longer life,

William Faloon

(Scientific references to this article begin on page 16.)
Unlike commercial blood labs that test only a few risk factors, Life Extension®'s Male and Female Blood Test Panels measure a wide range of blood markers that predispose people to age-related diseases. Just look at the huge number of parameters included in the Male and Female Blood Test Panels:

### MALE PANEL

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

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

**HORMONES**
- Free and Total Testosterone
- DHEA-S
- Estradiol (an estrogen)
- TSH (thyroid function)
- Vitamin D (25-hydroxyvitamin D)

**METABOLIC PROFILE**
- Glucose
- Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
- Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
- Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
- Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
- Hemoglobin A1c

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

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

### FEMALE PANEL

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

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

**HORMONES**
- Progesterone
- Estradiol (an estrogen)
- TSH (thyroid function)
- Vitamin D (25-hydroxyvitamin D)

**METABOLIC PROFILE**
- Glucose
- Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
- Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
- Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
- Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
- Hemoglobin A1c

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

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**Blood Test Super Sale • March 28 through June 6, 2016.**

Retail price: $400  
Your Price: $199

To obtain these comprehensive Male or Female Panels at these low prices, call 1-800-208-3444 to order your requisition forms.

Then—at your convenience—you can visit one of the blood-drawing facilities provided by LabCorp in your area.

Blood testing services are available only in the continental United States and Anchorage, AK. Not available in Maryland. Restrictions apply for residents of MA, NY, NJ, RI, and PA.
References


HIGHERLY PURIFIED ALASKAN FISH OIL

Super Omega-3

FISH OIL + OLIVE EXTRACT + SESAME LIGNANS

Broad-spectrum, Mediterranean health benefits of fish oil, olive oil polyphenols, and sesame lignans for heart and brain health.

- Pure fish oil from sustainable sources in pristine waters in Alaska*, highest 5-star rating by leading independent third-party testing organization (IFOS).
- Provides the polyphenol equivalent of 8 to 12 tablespoons of heart-healthy extra virgin olive oil.
- Specialized support against free radical oxidation with sesame lignans, a novel component of the heart-healthy Mediterranean diet.

To order Super Omega-3, call 1-800-544-4440 or visit www.LifeExtension.com

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product. Supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
INCREASE SKELETAL STRENGTH AND BOOST BONE DENSITY

It takes more than calcium to build strong bones...a host of skeletal-promoting nutrients are needed.

Bone Restore supplies a highly absorbable form of calcium in a combination of critical bone-building compounds:

- Boron,
- Vitamin D3,
- Magnesium,
- Manganese,
- Zinc,
- Silicon, and
- Vitamin K2 (long-acting MK-7 form).

Vitamin K2 is essential to maintain skeletal integrity.

Bone Restore with Vitamin K2
Item #01727 • 120 capsules

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Bone Restore without Vitamin K
For those taking Super K or Health Booster, additional vitamin K2 is not needed. Bone Restore (without vitamin K) is available as Item #01726 at a slightly lower price.

To order Bone Restore with Vitamin K2, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
As skin ages, it loses suppleness and smoothness. A prime reason is loss of ceramides that are required for skin to retain its moisture.

Skin Restoring Phytoceramides contains wheat-derived ceramide oils in an oral capsule that hydrates the deepest dermal layers to nourish the entire body’s skin.

Skin Restoring Phytoceramides with Lipowheat® • Item #01596
30 liquid vegetarian capsules • Non-GMO

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

Contains wheat. Gluten free. Lipowheat® is a registered trademark of Arco, Robertet Group, France.

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.
**Blood Test Predicts Second Stroke Risk**

Scientists at the University of Virginia have linked high levels of **C-reactive protein** with an increased risk of ischemic stroke.*

*C-reactive protein** is produced in the liver in response to inflammation, and is currently measured to assess a person’s risk of developing coronary artery disease. Life Extension® first drew a correlation between high C-reactive protein and stroke in the early 2000s.

Ischemic strokes, which are responsible for 85% of all stroke cases, result from blockages that prevent blood flow to the brain. Stephen Williams, PhD, and colleagues wanted to determine how genes affect the levels of biomarkers such as C-reactive protein in blood. They discovered that not only did elevated C-reactive protein levels suggest an increased stroke risk, they identified gene variations that induce those risks.

“We have the genetics influencing C-reactive protein levels, which then increases the risk of having a recurrent stroke,” said Williams. “Then we went back and said alright, can we predict the increased risk purely based on the genetics, which we were able to do.

“There is this shared genetic susceptibility not only for increased C-reactive protein but for increased risk for stroke. We could estimate what is called a hazard ratio—basically the increased risk for having or not having a second stroke—based on the genetics.”

**Editor’s Note:** Supplementing with an omega-3 product that includes krill and astaxanthin as well as an omega-7 product has been shown to decrease C-reactive protein by 44%.


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**Increased B Vitamin Intake Associated with Lower Pancreatic Cancer Risk**

Pancreatic cancer kills 40,000 Americans each year. **Life Extension Foundation** is funding a clinical trial at the **City of Hope Hospital** in Southern California with the objective of improving survival in advanced pancreatic cancer patients.

There is an urgent need for people to reduce risk factors involved in pancreatic carcinogenesis. Encouraging news has arrived in a study showing markedly lower pancreatic cancer rates in those with higher intakes of common dietary supplements.

Researchers from the University of Pittsburgh have uncovered an association between an increase in the intake of vitamin B6 and choline and a lower risk of cancer of the pancreas. The findings were reported in Cancer Epidemiology, Biomarkers & Prevention.*

J. Huang and colleagues utilized data from the Singapore Chinese Health database that enrolled 63,257 men and women between 1993 and 1998. Dietary questionnaire responses provided information on the intake of individual nutrients, which include vitamins B6, choline, and other nutrients. Over an average of 16.3 years of follow-up, 271 pancreatic cancer cases were identified.

Among subjects whose intake of vitamin B6 was among the top 20% of participants, there was a 48% lower risk of developing pancreatic cancer in comparison with those whose intake was among the lowest 20%. For those whose choline intake was highest, the risk of pancreatic cancer was 33% lower.

**Editor's Note:** As possible cancer-protective mechanisms for vitamin B6, the authors cite its role as a co-factor for enzymes involved in DNA synthesis and methylation pathways of one-carbon metabolism, as well as an ability to protect DNA from oxidative damage. In regard to choline, its role as a methyl donor may also help protect against pancreatic carcinogenesis.

Baldness Linked to Prostate Cancer Death

A new study published in American Journal of Epidemiology found that male pattern baldness is linked not only to a higher risk of developing prostate cancer but also with a higher risk of prostate cancer death.1

Researchers analyzed data on 4,316 men aged 25 to 74 years old who had not been diagnosed with cancer before the study started. To date, there have been 3,284 deaths, 107 from prostate cancer.

Researchers found the risk for death from prostate cancer was 56% higher in men with any baldness than in those with no baldness. In men with moderate balding, the risk was 83% higher.

Although more research is needed, testosterone may be the link between the two. Dihydrotestosterone (DHT) is a male hormone produced from testosterone by an enzyme called 5-alpha-reductase. Dihydrotestosterone is linked with both the growth of prostate cells and baldness in older men.

Please note that higher testosterone itself has not been shown to increase prostate cancer risk. In fact, men with lower levels of testosterone have greater risks of aggressive prostate malignancies.2-5

From what is known today, aging men should seek to reduce their levels of dihydrotestosterone while maintaining their testosterone in youthful ranges.

Two medications that reduce dihydrotestosterone levels, Proscar® (finasteride) and Avodart® (dutasteride), have been shown in studies to reduce the risk of prostate cancer and reduce prostate gland volume by 17% to 25% in a relatively short period of time.

Editor’s Note: Baldness is not a certain risk factor for prostate cancer, says researcher Michael Cook, PhD, of the National Cancer Institute, despite the findings. But, he adds: “It is conceivable that, in the future, patterns and degree of male baldness may play a small role in estimating risk of prostate cancer.”

References:

Blueberries Show Promise for Cognitive Impairment

The 251st National Meeting & Exposition of the American Chemical Society was the site of a presentation concerning improved cognitive function in association with blueberry consumption among individuals with mild cognitive impairment.*

Robert Krikorian, PhD, presented the results of two studies concerning the effects of blueberries in older adults. In the first study, 47 participants with mild cognitive impairment were given the freeze-dried powder equivalent of a cup of fresh blueberries or a placebo daily for 16 weeks. “There was improvement in cognitive performance and brain function in those who had the blueberry powder compared with those who took the placebo,” Dr. Krikorian reported.

In the second study, 94 participants with subjective memory complaints received blueberry powder, fish oil, fish oil plus blueberry powder, or a placebo. While improvement in cognition occurred in association with blueberry or fish oil, Dr. Krikorian noted that “the results were not as robust as with the first study.”

Editor’s Note: Dr. Krikorian suggested that the second study’s smaller effects could be attributable to less severe symptoms among its subjects compared to those in the first study. Blueberries may be more effective for those diagnosed with cognitive impairment rather than those with minor memory complaints.


Urgent Need to Test Blood of Younger People

Scientific studies validate the urgent need for everyone to have their blood tested for cholesterol, triglycerides, glucose, calcium, and other cardiac risk factors no later than age 18.

A study published in the Annals of Internal Medicine looked at a large group whose blood was initially tested between ages 18 to 30.* Seven additional blood tests were done on each person over a 20-year period. The results showed that those with the highest LDL (over 160 mg/dL) were 5.6 times more likely to have calcium buildup in their coronary arteries by age 45.

LDL (low-density lipoprotein) transports cholesterol from the liver throughout the vascular system. In the presence of excess LDL, too much cholesterol saturates the blood and contributes to arterial occlusion.

Editor’s Note: This study showed that over a 20-year period, those with even moderately elevated LDL (100-129 mg/dL) were 2.4 times more likely to have coronary calcification.

Fish Oil and Vitamin B12 Reduce Plasma Homocysteine

The September 2015 issue of Asia Pacific Journal of Clinical Nutrition published the finding of researchers at Zhejiang University in China of a reduction in plasma homocysteine levels following supplementation with vitamin B12 and/or fish oil.*

Thirty men and women were randomly assigned to receive 1,000 micrograms vitamin B12, 2 grams fish oil, or 2 grams fish oil plus 1,000 micrograms vitamin B12. Plasma vitamin B12, lipids, ferritin (a biomarker of iron status), C-reactive protein, homocysteine, and other factors were measured before treatment and after four and eight weeks of supplementation.

Among those who received fish oil alone or fish oil plus vitamin B12, triglycerides, C-reactive protein and ferritin significantly decreased after four and eight weeks. Homocysteine was lowered by 22% in the vitamin B12 group, 19% in the fish oil group, and 39% among those who received both supplements for eight weeks.

Editor’s Note: Homocysteine is an amino acid made from methionine that inflicts damage to the inner arterial lining (endothelium) and increases the risk of cardiovascular disease and other conditions.


Higher Serum Magnesium Levels Linked with Lower Risk of Heart Disease and Sudden Cardiac Death

A study reported in the Journal of the American Heart Association uncovered an association between higher magnesium levels and a decreased risk of coronary heart disease and sudden cardiac death over a median follow-up of 8.7 years.*

For their research, Brenda Kieboom, MD, and colleagues at Erasmus MC–University Medical Center in The Netherlands evaluated data from 9,820 participants in the Rotterdam Study of men and women aged 55 and older. Among 2,303 deaths over follow-up, 780 were attributed to cardiovascular disease, among which 431 were classified as coronary heart disease deaths, including 187 sudden cardiac deaths.

For subjects whose serum magnesium was categorized as low, there was a 36% higher risk of coronary heart disease mortality and a 54% greater risk of sudden cardiac death in comparison with those who had levels in the middle range.

Editor’s Note: “The results from this and previous studies may provide a rationale to design intervention studies to analyze whether magnesium supplementation could prove to be effective in lowering the burden of coronary heart disease mortality and sudden cardiac death,” the authors said.

*J Am Heart Assoc. 2016 Jan 22.
Vitamin D3 Lowers Inflammatory T Cells in Multiple Sclerosis Patients

Results from a study reported in the journal Neurology suggest a benefit for treatment with high-dose vitamin D for people diagnosed with multiple sclerosis.*

Peter A. Calabresi, MD, and colleagues tested the effects of vitamin D supplementation in a study involving 40 relapsing-remitting multiple sclerosis patients. Participants were treated for six months with 10,400 IU or 800 IU vitamin D. Serum levels of 25-hydroxyvitamin D were measured at the beginning of the study and at three and six months.

Subjects who received the higher dose of vitamin D experienced an average 34.9 ng/mL increase in serum vitamin D by the end of the study, while levels increased by just 6.9 ng/mL in the low-dose group. Among those who received the higher dose, the proportion of pro-inflammatory interleukin 17 (IL-17) producing cells decreased, suggesting a reduction in disease severity.

Editor’s Note: “These results are exciting, as vitamin D has the potential to be an inexpensive, safe, and convenient treatment for people with MS,” stated Dr. Calabresi, the director of the Johns Hopkins Multiple Sclerosis Center. “We hope that these changes in inflammatory T cell responses translate to a reduced severity of disease. Other clinical trials are underway to determine if that is the case.”


Meta-Analysis Adds Evidence to Antidepressant Effect of Omega-3

An article reported in Translational Psychiatry adds more evidence to the association between higher omega-3 fatty acid intake and a lower risk of major depressive disorder (MDD).*

Roel J. T. Mocking and colleagues selected 13 trials that included 1,233 subjects for their analysis. Studies were restricted to randomized placebo-controlled trials of adults diagnosed with major depressive disorder, excluding major depressive disorder secondary to other neuropsychiatric disorders, and perinatal and perimenopausal major depressive disorder.

Compared to placebo, omega-3 fatty acid intake was associated with beneficial effects, particularly among participants who were using antidepressant drugs or who received higher doses of the omega-3 fatty acid eicosapentaenoic acid (EPA). The authors suggest that omega-3’s antidepressant effect is the result of anti-inflammatory characteristics of EPA’s metabolic byproducts. “Future precision/personalized medicine trials should establish whether possible interactions between EPA and antidepressants could provide targets to improve antidepressant response and its prediction,” the authors conclude.

Editor’s Note: “Omega-3 supplements may be specifically effective in the form of EPA in depressed patients using antidepressants,” stated lead author Dr. Mocking. “This could be a next step to personalizing the treatment for depression and other disorders.”

Magnesium is the most important mineral in the body, yet most Americans do not obtain sufficient magnesium from their diet. Magnesium is required for more than 300 biochemical reactions and many of the body’s critical functions are dependent upon it. Magnesium helps:¹²

- Maintain normal muscle and nerve function.
- Keep heart rhythm steady.
- Support a healthy immune system.
- Keep bones strong.
- Maintain blood sugar levels already within normal range.
- Promote normal blood pressure. Magnesium is also...
- Involved in energy metabolism and protein synthesis.

The recommended intake of magnesium to maintain vascular health is 500 mg or more a day. With Life Extension® Magnesium Caps, you can easily obtain 500 mg of elemental magnesium for less than 7 cents a day!

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

References

To order Magnesium Caps, 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.
Scientists are increasingly discovering that probiotics impact the health of the entire body. Unfortunately, most commercial probiotics are destroyed by the stomach’s natural digestive acids before they reach their destination.

**FLORASSIST® Balance** with “dual encapsulation” technology delivers maximum probiotic protection to your small intestines.

**FLORASSIST® Balance:**
- Contains probiotic strains that are **stomach acid resistant**
- Has **dual encapsulation technology**, which keeps the capsule intact longer and ensures that the probiotic reaches the small intestine
- Provides **15 billion CFU**—Colony Forming Units—per capsule
- Contains **6** varieties of beneficial bacteria

**FLORASSIST® Balance contains the following bacterial strains:**
1. *Lactobacillus acidophilus LA-14*
2. *Lactobacillus rhamnosus LR-32*
3. *Lactobacillus paracasei LPC-37*
4. *Bifidobacterium longum BL-05*
5. *Bifidobacterium lactis BL-04*
6. *Bifidobacterium bifidum/lactis BB-02*

These potent strains of probiotic bacteria adhere to the soft lining of the intestinal tract to help maintain a healthy surface and aid in support for the digestive system.

**References**

To order **FLORASSIST® Balance**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com).
Low-Cost Biologically Active B-COMPLEX

Maintaining optimal vitamin B status becomes critical as we age.

B vitamins must be replenished daily because they are water soluble and easily depleted from the body. Stress, alcoholic beverages, and some medications can quickly deplete B vitamins.

Enzymatically Active Vitamins

When conventional B vitamins are ingested, they must be enzymatically converted in the body to metabolically active forms.

BioActive Complete B-Complex provides enzymatically active forms of meaningful potencies of each B vitamin. This includes the pyridoxal 5'-phosphate form of vitamin B6 (the metabolically active form, shown to protect lipids and proteins against glycation reactions) and the most biologically active form of folate called 5-methyltetrahydrofolate (5-MTHF), which is up to 7 times more bioavailable than folic acid and requires no enzymatic conversion to become metabolically active.

BioActive Complete B-Complex

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In a recent advance, researchers showed that a vitamin B nutrient called **nicotinamide** can reduce the risk of skin cancer by **23%!** This is a rate of protection unparalleled by **any** known compound.

What researchers have confirmed is **nicotinamide** plays a significant role in producing **ATP**, which facilitates **DNA repair** in skin cells damaged by solar radiation. Rapidly restoring sun-damaged DNA provides powerful protection against malignant transformation.

When combined with two other natural ingredients, the protection from harmful **solar rays** is expanded as these tropical **plant extracts** defend against sun damage and further promote **DNA repair**.

This discovery is timely and important since skin cancer is now the most common form of malignancy in the United States, affecting over **3 million** Americans each year.

It is now possible to prevent DNA damage, promote DNA repair, and impede ultraviolet radiation immune suppression by taking **oral nutrients**.

This discovery can help reduce the epidemic of **skin cancers** that impact a greater number of individuals each year.
The Sun and Skin Cancer Connection

Ultraviolet radiation from sunlight is the primary cause of skin cancers of all kinds. In fact, sunlight and ultraviolet radiation are considered “complete carcinogens” for squamous cell carcinoma and its precursor, actinic keratosis. This means that no other initiating factor is required to produce these conditions.14

It is now clear that excessive ultraviolet exposure is associated with 65% of cases of malignant melanoma, the deadliest skin cancer, and 90% of non-melanoma skin cancers (squamous and basal cell carcinomas).15 According to the American Cancer Society, it is estimated that in 2016 more than 13,000 deaths will occur from different types of skin cancer.16 Nearly 5 million Americans are treated with skin cancer annually, accounting for over $8.1 billion in health care expenditures.10

The number of sunburns a person experiences increases the chances of getting one of these cancers.14

How Solar Ultraviolet Radiation Causes Cancer

So why is ultraviolet radiation so dangerous? As sunlight reaches the earth and ultraviolet radiation strikes the human skin, changes characterized by the formation of cancer-producing compounds trigger DNA mutations.17-19

Our bodies have multiple repair systems that can remove the damaged portions of DNA and restore...
their normal sequence. To be effective, these repair systems require a steady and ample supply of adenosine triphosphate (ATP), the energy-releasing molecule that fuels all cells to power their intracellular machinery.

Unfortunately, supplies of ATP tend to decrease with age, a problem that is compounded by the fact that ultraviolet radiation itself inhibits the production of ATP.

Insufficient ATP supplies means inefficient DNA repair. In other words, ultraviolet-exposed skin cells are not only at increased risk of DNA damage, but they are also impeded in their attempts to repair that damage before it triggers malignant transformation.

Further complicating matters, even small doses of ultraviolet radiation suppress the immune system in the skin, reducing the body’s ability to identify and destroy potentially malignant cells before they go rogue.

The good news is that studies show that promoting rapid DNA repair is an effective means of preventing malignant transformation in skin cells.

Even better, science has identified three specific nutrients that work together to provide protection from the ill effects of solar radiation. Together, nicotinamide, red orange extract, and Polypodium leucotomos extract help prevent DNA damage, promote DNA repair, reverse immune suppression, and reduce the twin threats of oxidation and inflammation that arise from ultraviolet exposure.

Nicotinamide Protects against Skin Cancer

Nicotinamide (vitamin B3) is a safe vitamin that had shown promise in lab and animals studies in preventing skin cancers, especially the most common, non-melanoma variety. In addition, studies in heavily sun-damaged people show that nicotinamide provides protection from precancerous actinic keratosis, as well as from new non-melanoma skin cancers.

In the most compelling and important study to date, researchers enrolled 386 healthy subjects with a history of at least two non-melanoma skin cancers in the past five years. Subjects received either twice-daily nicotinamide (500 mg per dose) or placebo for 12 months.

The researchers were stunned at the results. At 12 months, the rate of new non-melanoma skin cancers was significantly reduced by 23% in supplemented subjects compared to the placebo group. It is almost unheard of for any single biological intervention to reduce the rate of cancer in people at risk by a figure as high as 23% overall.
When the carcinomas were broken down by tumor type, supplemented subjects had 20% fewer new diagnoses of basal cell carcinomas and 30% fewer new diagnoses of squamous cell carcinomas.1

In addition, supplemented individuals had an 11% reduction in the rate of new premalignant actinic keratoses three months into the study. That reduction was 13% at 12 months. Once supplementation was discontinued, however, no evidence of further benefit was seen. This lets us know the importance of continuous oral intake of nicotinamide, an inexpensive B vitamin that does not cause skin flushing.1

How Nicotinamide Works

What makes nicotinamide so powerful against skin cancer?

The answer lies in two of nicotinamide’s most fundamental properties: its role in producing ATP and its ability to protect against ultraviolet-induced immunosuppression.2

As stated earlier, the body relies on an ample supply of ATP to repair and remove the damaged portions of DNA and restore their normal sequence. By helping the body produce more ATP, nicotinamide helps to ensure continuous and efficient DNA repair mechanisms. In fact, nicotinamide has been shown to repair ultraviolet-induced DNA damage in two ways, making it extremely effective.2,12

In a cell culture experiment, researchers treated skin cells with nicotinamide and then exposed them to low-dose simulated solar ultraviolet radiation. The nicotinamide treatment significantly increased the number of cells undergoing DNA repair. It accomplished this by removing and replacing damaged DNA and by increasing the repair rate in each cell.2

In a second portion of the experiment, researchers measured the production of molecular products of DNA damage within cells, which is another means of mea-
suring DNA damage and repair. They found that nicotinamide reduced the concentration of those marker molecules both in cells in culture and in human skin.²

A similar cell culture study using melanocytes (pigmented skin cells that can develop into deadly melanomas) showed virtually identical results. Nicotinamide treatment led to a reduction in markers of DNA damage and enhanced evidence of DNA repair.¹²

Immune Support

We learned earlier that ultraviolet radiation suppresses the immune system in the skin, which reduces the body’s natural ability to identify and destroy potentially malignant cells. Ultraviolet radiation is so effective at suppressing the immune system that it is used in certain patients with severe autoimmune disorders to turn down their overactive immune system.

Human studies show that nicotinamide protects against ultraviolet-induced immune suppression.

In one such study, healthy volunteers took either a placebo or nicotinamide at doses of 500 or 1,500 mg daily for one week. On the third day after supplementation, subjects underwent low-dose irradiation of distinct areas of their back for three days, at three fixed doses.¹³

As expected, the placebo recipients showed substantial immunosuppression of skin in the irradiated areas. When compared to placebo groups, subjects taking either dose of nicotinamide showed significant reductions of 50% to 66% (depending on radiation dose), with no effects seen in unirradiated skin. It is important to note that all subjects tolerated the supplement well and that the low dose (500 mg) of nicotinamide delivered similar immune protection as the high dose (1,500 mg).¹³

The Problem with Topical Sunscreens

Skin cancers affect over 3 million Americans each year, killing tens of thousands. These shocking numbers continue to climb with each passing year.⁸⁻¹¹

Clearly, despite aggressive public education campaigns, Americans remain unable to protect themselves sufficiently from the cancer-inducing effects of solar radiation. That’s not to say that taking protective measures such as wearing a hat, covering up, seeking shade, and wearing topical sunscreens aren’t important. They are.

Unfortunately, most topical sunscreens have other limitations. They only block a portion of ultraviolet radiation from reaching the skin, they often break down under solar radiation (which reduces their effectiveness), and their content of free radical scavengers is woefully inadequate to deal with the intense release of oxygen free radicals deep within skin exposed to ultraviolet light.²⁶

That’s what makes the development of an oral sunscreen so revolutionary.

By avoiding the pitfalls of most topical sunscreens, oral sunscreens add a tremendous convenience factor that is likely to enhance people’s willingness to use sun protection. In this way, daily oral sun protection can become routine, just like taking other supplements.

If thought of as cancer prevention, rather than simply sunburn protection, most people will take this regimen more seriously than they do topical sunscreens. The result will be more broad-spectrum protection against the negative effects of the sun—and likely a reduction in the risk of skin cancers.
Red Orange Extract for DNA Protection

Recent laboratory studies have demonstrated that red orange extract adds to nicotinamide’s DNA-protective, immune-boosting effects.

Red orange extract is a powder obtained by a patented process from three pigmented varieties of Citrus sinensis. This extract is rich in anthocyanins, flavanones, and hydroxycinnamic acids. All of these nutrients have been found to enhance the body’s natural ability to protect itself against ultraviolet radiation.3-6 These biomolecules also offer protection from the inflammation3,6 and oxidative stress caused by ultraviolet radiation.4

In one study, red orange extract has been clinically shown to reduce the intensity of sunburn by about 35% after 15 days of treatment.27 This demonstrated the ability of red orange extract to prevent skin damage and potentially reduce skin cancer risk. The ability to reduce the intensity of a sunburn is an important finding, given the close correlation between the number of lifetime sunburns and the risk of developing skin cancers.14

Let’s take a look at a few of the studies that show these benefits.

In one study, when human skin cells (keratinocytes) were exposed to ultraviolet radiation, the application of red orange extract reduced ultraviolet-induced cell damage, helped prevent inflammation, and reduced cell death in response to ultraviolet radiation.5

Similar results were found in human cultured skin cells (keratinocytes and fibroblasts) exposed to powerful oxidants, demonstrating the ability of red orange extract to reduce oxidant stress.28

Polypodium Leucotomos Extract Protects against Ultraviolet Radiation

Polypodium leucotomos extract is obtained from a tropical fern, which has a long history as a treatment for psoriasis and other inflammatory skin conditions.7,29 The extract is rich in polyphenols that potently inhibit oxidant stress and inflammation, while also protecting skin cells against ultraviolet radiation.7

In a study of 10 healthy volunteers aged 29 to 54, researchers randomly assigned patients to receive two 240 mg doses of Polypodium leucotomos extract or a placebo prior to exposing them to a dose of ultraviolet radiation, then took skin biopsies.7 At a lower dose of ultraviolet light, placebo subjects had a dangerous increase in a marker of DNA damage (called the “common deletion”) by 217%. Subjects in the supplemented group had a decrease in the marker of 84%. At a higher level of ultraviolet exposure, DNA damage increased by 760% in placebo subjects, while increasing only 61% in the supplemented group.

The impact of these results was seen in a human study in which subjects were given Polypodium leucotomos extract twice daily for 15 days. The researchers found that the subjects could tolerate a significantly larger dose of ultraviolet light before showing skin redness (a marker of exposure/damage) compared with their ultraviolet tolerance prior to supplementation. Subjects also recovered faster from ultraviolet-induced inflammation.30
**Summary**

In a remarkable development, scientists have discovered that nicotinamide, a well-known natural supplement and essential cellular component, can reduce the rate of new skin cancers by 23% following oral supplementation.

Nicotinamide appears to exert its beneficial efforts primarily through prevention of DNA damage and promotion of DNA repair, two early processes that can stop cancer initiation.

Two additional natural ingredients, red orange extract and Polypodium leucotomos extract, offer complementary benefits, providing protection against the reactive chemical compounds produced inside cells when exposed to ultraviolet radiation. These extracts also help to suppress the inflammatory response to radiation exposure, which is known to contribute to cancer progression.

What few people realize is that everyday exposure to solar rays causes cumulative DNA damage, accelerates skin aging, and increases skin cancer risk.

The advent of three natural compounds provides an oral sun protection formula that can be used daily to protect skin from routine solar exposure. These nutrients also complement any topical creams or lotions by protecting even hard-to-reach area of one’s skin.

Daily supplementation should provide a strong baseline of protection against the sun’s ill effects. However, when prolonged exposure to the sun is planned, the usual recommendations for sun protection still apply in order to provide maximum skin cancer-preventive effects.

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**Photodynamic Therapy**

Nicotinamide has been shown to powerfully prevent ultraviolet-induced immunosuppression. This makes it especially valuable in patients undergoing photodynamic therapy.

In this treatment for non-melanoma skin cancers, visible light is used in combination with chemical photosensitizers in an effort to specifically target skin cells affected by the cancer. Unfortunately, up to 45% of people treated with this approach have resistant or recurrent tumors that are directly related to the light-induced immune suppression in the area of irradiation.

This makes photodynamic therapy a double-edged sword, since it potentially condemns nearly half of its recipients to further battles with malignancy. This presents an ideal scenario for the use of nicotinamide—and in fact, one study has already proven its benefits.

Subjects in this study received a placebo or 500 mg of nicotinamide twice a day for seven days. On day three, subjects received photodynamic therapy to discrete areas of the back, while adjacent, non-irradiated areas served as control patches. Immunosuppression in the skin was determined by injection of a known antigen to which volunteers were all sensitive, and to which they were expected to produce a reaction in the skin. (Skin redness as well as the diameter of the reaction were measured.)

Subjects receiving the placebo showed 50% suppression of the skin reaction, as expected. But in those receiving nicotinamide, the immunosuppression was itself reduced, resulting in 66% less redness and a 90% reduction in diameter of the reaction site. A similar group of subjects received nicotinamide cream or a placebo cream, and again, immunosuppression was reduced in treated subjects by 59% compared with placebo.

This study powerfully demonstrates nicotinamide’s ability to combat immunosuppression and support the immune system’s ability to detect and destroy developing cancers.
ORAL SUNSCREEN REDUCES SKIN CANCER RISK

References


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- Enhance growth of mitochondria—supporting energy levels and physical performance,
- Favorably modulate metabolism,
- Contribute to neuronal health and cognitive function during aging,
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The suggested daily dose of one NAD+ Cell Regenerator™ vegetarian capsule provides 100 mg of NIAGEN® Nicotinamide Riboside.

References

NAD+ Cell Regenerator™

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The **Shade Factor** formula provides the following ingredients in each capsule:

- **Polypodium leucotomos**
- **Nicotinamide**
- **Red Orange Complex®**

**Shade Factor** supports the body’s natural photo-protection and immune response against the age-related effects of ultraviolet exposure by:

1. Promoting healthy DNA function after ultraviolet exposure
2. Encouraging protective ATP production
3. Protecting the body’s entire skin surface

The good news is that it cannot be removed by perspiring or bathing, meaning it provides all-day protection.

**References**


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Unique Magnesium Compound Reverses Brain Aging
Scientists have been surprised by the discovery that magnesium plays an essential role in supporting brain plasticity, which is the sign of a youthful, flexible brain primed for optimal learning, memory, and cognitive function.¹

The good news is that raising brain magnesium levels has been proven to restore critical brain plasticity and improve cognitive function.¹ In a just-published landmark human study, researchers showed that they could reverse brain aging by as much as nine to 14 years in magnesium-supplemented people.²

Scientists at the Massachusetts Institute of Technology (MIT) found a novel way of overcoming the problem of getting magnesium loaded into the brain due to poor absorption.¹

These researchers tested a unique compound called magnesium-L-threonate and found it boosted brain magnesium levels by an approximate 15%.¹

When comparing various forms of magnesium, they found that magnesium-L-threonate had the highest bioavailability and brain magnesium-loading ability.

As a result, studies show that magnesium-L-threonate improves brain plasticity, leading to direct and significant improvements in memory, learning, and cognition.³
But they were wrong. Recent studies have shown that increasing brain magnesium levels can reverse deteriorating brain plasticity. The result is considerable restoration of cognitive function both in healthy adults and in those with neurodegenerative diseases.1,6-8

The Magnesium Connection

Magnesium is absolutely critical for maintaining healthy brain plasticity. This is because magnesium regulates how brain cells form those critical connections that are the foundation of learning and memory.1-3

Brain plasticity is now understood to be the very foundation of learning and memory.4 This means that changes in memory (including the formation of new memories and learning of new concepts) requires changes in those synaptic connections, hence the term, plasticity.

As you are reading this article, your brain is forming and reforming new neural connections.

With aging, we lose brain plasticity, which results in a loss of cognitive function.5 That's why a young person, with an active, flexible brain, easily latches on to new ideas and simply thinks faster than an older person whose brain has lost plasticity and is more fixed in its patterns.

As recently as a decade ago, scientists thought that loss of vital brain plasticity was inevitable due to age.

The Foundation of Learning and Memory

The human brain is capable of forming new connections between neurons. When we take in new information, an electro-chemical signal is sent across the space between neurons (called the synaptic space). This ability of the brain to form new connections or neural pathways to communicate with each other is often referred to as brain plasticity.

Think of it as the ability to learn a new skill, like a dance move. Our brains generate new neural pathways or “wires” to master the particular skill. On the contrary, when these “wires” become faulty or deteriorate, memories start fading and individuals can forget simple things like names or phone numbers.

Brain plasticity is now understood to be the very foundation of learning and memory.4 This means that changes in memory (including the formation of new memories and learning of new concepts) requires changes in those synaptic connections, hence the term, plasticity.

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As recently as a decade ago, scientists thought that loss of vital brain plasticity was inevitable due to age.
The reason memory is impacted is because low levels of magnesium create decreases in the strengthening of connections between brain cells that lead to memory formation. In addition to impacting memory, chronically low calcium and magnesium levels in the diet have also been shown to correlate with a high incidence of neurodegenerative diseases.

Basic lab studies have shown that boosting magnesium concentrations at excitatory synapses can enhance brain plasticity. In brain cells cultured from the hippocampus (the part of the brain where we store and retrieve memories), these changes led to more permanent enhancements of brain plasticity, demonstrating long-lasting improvement. (It is important to note that the levels of magnesium needed to improve plasticity are well within the normal physiological range, not exceedingly high.)

Studies in diabetic rats provide further support for magnesium’s ability to reverse losses in brain plasticity and restore cognitive function.

Like diabetic humans, these rats have a high risk of developing Alzheimer’s disease. Researchers found that elevating brain magnesium levels with injected magnesium protected learning and memory in diabetic rats with spontaneous Alzheimer’s-like symptoms. Elevating brain magnesium levels also reversed impairments in synaptic function and long-term potentiation (the cellular equivalent of learning).

These studies make it clear that elevating brain levels of magnesium helps to improve cognition by improving plasticity (the ability to make connections between brain cells) and long-term potentiation (the strengthening of those connections).

But, one of the biggest challenges that researchers have encountered is delivering sufficient amounts of magnesium into the brain. Fortunately, scientists at the Massachusetts Institute of Technology (MIT) have found a solution.

**What You Need to Know**

**Magnesium Improves Brain Plasticity**

- Brain plasticity, the ability to remodel connections between brain cells, is the physical foundation of memory and cognition.
- Loss of memory and cognitive function in old age and in neurodegenerative diseases is the result of lost brain plasticity.
- Studies show that raising brain magnesium levels restores lost plasticity and improves cognitive function in aging animals and in models of neurodegenerative diseases.
- But conventional magnesium supplements fail to significantly raise brain magnesium levels.
- A novel form of magnesium, magnesium-L-threonate, has been developed, which is capable of rapid absorption and superior delivery to brain tissue, raising brain magnesium levels by up to 15%.
- Animal studies reveal marked and significant improvements in memory, learning, and cognition with magnesium-L-threonate supplementation, and lab studies show corresponding improvements in synaptic structures that correlate with improved brain plasticity.
- New human data shows promising results in older adults with cognitive impairment after supplementing with magnesium-L-threonate.
- Regular supplementation with magnesium-L-threonate is essential for anyone concerned about age-related loss of cognitive function or neurodegenerative diseases.
A Breakthrough Form of Magnesium

Scientists at MIT set out to find a better-absorbed form of magnesium that also could boost concentrations of the mineral in the brain. After testing numerous compounds, they found what they were looking for in a unique compound called magnesium-L-threonate. This is a complex of magnesium along with threonic acid, a breakdown product of vitamin C.

Figure 1 shows the dramatic results of treating rats with magnesium-L-threonate (MgT) compared with untreated control animals and with those supplemented with two other forms of magnesium. Only magnesium-L-threonate proved capable of significantly raising magnesium levels in spinal fluid, which is a measure of brain magnesium.

Magnesium-L-threonate’s effects were even more remarkable on short- and long-term memory performance in live rats (Figure 2). Compared with the other forms of magnesium, the animals that were supplemented with magnesium-L-threonate demonstrated significantly greater memory retention over 10 minutes and 12 hours (Refer to Figure 2 charts on next page).

In addition to short- and long-term memory improvements, rats supplemented with magnesium-L-threonate demonstrated enhanced learning abilities and enhanced working memory, which are essential for normal cognitive function.

And in aged rats, supplemented animals were better at pattern completion (ability to retrieve memories based on incomplete information) compared with control animals.

Microscopic examination of brain tissue explained the reason for these dramatic improvements. As expected, the rats supplemented with magnesium-L-threonate had higher densities of synaptic proteins associated with memory formation, especially in the hippocampus. These findings correlated with the animals’ improved memory performance on testing.

In addition, the magnesium increased the number of release sites at the presynaptic nerve endings, but reduced their overall probability of releasing neurotransmitters. This reconfiguration enabled synapses to more finely tune their transmissions, resulting in greater plasticity. The synapses were, in effect, “trained” to respond only to the “right” stimuli, producing improved memories in the live animals.

Finally, the increase in brain magnesium levels enhanced long-term potentiation, which is the process that refers to the strengthening of connections between brain cells based on recent patterns of activity that is associated with enhanced learning and memory.
Alzheimer’s Disease

The ability of magnesium-L-threonate to enhance brain plasticity is of tremendous interest to researchers studying Alzheimer’s disease. As tangles of toxic beta amyloid protein develop in Alzheimer’s patients, they trigger brain cell death and the loss of brain synapses. This hinders brain plasticity and ultimately impairs cognition.

Magnesium-L-threonate has now been tested in a widely accepted mouse model of Alzheimer’s disease. In this type of study, mice are bred to show brain structural problems and cognitive defects that closely resemble those in human Alzheimer’s.

When the researchers treated mice early in their disease progression with magnesium-L-threonate, it prevented the loss of synapses and the decline of memory that occurred in untreated animals. To the researchers’ surprise, the supplemented animals showed these effects even when the magnesium-L-threonate was given at the end-stage of their cognitive decline.

This surprising result might be related to magnesium’s ability to help prevent and clear the accumulation of toxic beta amyloid plaques. In one particular study, magnesium-L-threonate supplementation suppressed the expression of the enzyme responsible for beta amyloid deposits by an impressive 80%.

The researchers determined that, based on these results, magnesium could play a role in the prevention of Alzheimer’s.

New Findings for Post-Traumatic Stress Disorder

While Alzheimer’s is the most urgent demonstration of restoration of brain plasticity by magnesium-L-threonate, it is far from the only potential application for this supplement.

Researchers also found that magnesium-L-threonate has beneficial effects for those suffering from post-traumatic stress disorder (PTSD). Sometimes when our brains form connections, they aren’t good ones. For example, certain objects or events linked with a previous danger triggers fear memories. In healthy people, these fear memories fade in time as the object triggering them is experienced in a safe environment. (Perhaps this is the likely scientific explanation for the phrase “time heals all wounds.”)

For example, if you experienced a house fire, hearing fire engines could reproduce the feelings of fear experienced from the fire itself. In time, that feeling will fade when the triggering event is experienced in a safe environment.

Unfortunately, in people who suffer from post-traumatic stress disorder, that fear response does not
fade with time. This is likely due to the fact that post-traumatic stress disorder induces a sharp reduction in brain plasticity.21-24

Exciting research has demonstrated that magnesium-L-threonate can help speed up this recovery process in people suffering from post-traumatic stress disorder.

Scientists studied magnesium-L-threonate in rats with conditioned fear responses (the animal equivalent of post-traumatic stress disorder). Amazingly, the magnesium-L-threonate treatment helped the fear memory fade with time, without impacting the original memory.6,25

Research shows that magnesium-L-threonate enhances brain plasticity in specific regions of the brain most affected by traumatic events.6 Because of these dramatic results, scientists are suggesting that magnesium could be a novel supplement for those suffering from post-traumatic stress disorder, anxiety, or depression.6,25

**Recent Human Study**

A remarkable human study on magnesium-L-threonate was released late in 2015 with compelling results that corroborate and extend all of the previous laboratory findings.2

Men and women aged 50 to 70, who reported cognitive problems (e.g., memory and concentration) were enrolled in the study. They were randomly assigned to receive either placebo or a supplement containing magnesium-L-threonate. Subjects took 1.5 grams per day of the supplement if they weighed less than 154 pounds, and 2 grams per day if they weighed more.

Subjects were evaluated before starting the supplement and again at weeks six and 12 (end of the study). At each evaluation, subjects participated in a series of tests of cognitive function, while blood and urine tests were performed to calculate total body magnesium status.2

By 12 weeks, lab results showed that magnesium-L-threonate was effective at loading magnesium into the body, as well as into cells (red blood cells were used because it is impossible to safely sample brain cells in humans).2

This form of magnesium was shown to be effective at loading magnesium into the brain and at enhancing brain function. This was made clear by results of cognitive testing. Already by week six, supplemented subjects demonstrated significantly increased speed in tests of executive function (e.g., reasoning, problem-solving, and planning). By week 12, that increased speed reached an approximate 20% improvement over baseline, while placebo recipients experienced no significant change.2

**What Is Magnesium?**

Magnesium, the fourth most abundant mineral in the body, is known to be a co-factor for more than 300 reactions catalyzed by enzymes, including those essential for energy release from food and conversion to cellular work through formation of adenosine triphosphate, or ATP, in mitochondria. Magnesium is also required for the synthesis of DNA and RNA.27

Magnesium is especially important in all of our bodies’ electrical and electrochemical activities, including muscle contractions, heart rhythm, nerve conduction, and brain cell activity.27

The most common disturbance of magnesium in our bodies is hypomagnesemia, or low blood magnesium levels, which is widely recognized as a cause of seizures, hypertension, stroke, migraine headaches, attention deficit hyperactivity disorder, and metabolic conditions such as insulin resistance and type II diabetes.27

In addition to all of these known functions, magnesium has been found to be the controlling and essential factor in regulating synaptic plasticity in the brain, which is the physical process that underlies what we perceive as learning and memory.1
There was also a significant 13.1% improvement in supplemented subjects’ working memory (the memory we use, for example, to remember where we put things) and a significant 37.6% improvement in episodic memory (for example, the ability to put new faces and names together). And composite scores of overall cognitive ability rose significantly from baseline and compared with placebo at both weeks six and 12.

Tellingly, magnesium loading into red blood cells was significantly correlated with enhancement in overall cognitive ability in supplemented patients. This was a strong validation of earlier animal studies in which raising brain magnesium levels boosted cognitive function.

An unexpected benefit was also demonstrated when the researchers examined fluctuations in cognitive performance over time. Such a fluctuation is known to be an early sign of impending cognitive impairment. Not only did supplemented patients experience less cognitive fluctuation, but the changes that they did experience were primarily positive (performing better than usual).

All of these data provide impressive support for the use of magnesium-L-threonate to improve cognitive function. But the real shocker comes with an analysis of this study’s subjects in the context of normal brain aging.

The researchers compared results of their study with data from a second study of cognitively normal subjects. They determined that cognitive performance fell about 1.04% per year in the cognitive normal subjects. Researchers established that baseline performance in the first study was about 10% lower than that of age-matched controls. But after 12 weeks of supplementation, the average increase in performance was 10.3%, essentially restoring performance to that of age-matched people without cognitive decline.

A still more remarkable finding became evident when researchers used the normal cognition study to assign a “brain age” to each of their own study subjects. Using this calculation, for example, a 50-year-old with a 10% worse performance on cognitive testing would have a brain age equivalent to that of a cognitively normal 60-year-old (approximately 1% function loss per year).

Using that calculation, the researchers found that even though the average chronological age of subjects who completed their study was 57.8 years, their average brain age at baseline was 68.3 years. But by 12 weeks, the brain age of the supplemented subjects had fallen by an average of 9.4 years, while that of placebo recipients fell by less than a year.

In other words, supplementation with magnesium-L-threonate resulted in an effective reversal of brain age to near normal. The brain age reversal in subjects who had significant increases in red blood cell magnesium was still higher, at 14.6 years, moving those individuals into a brain age in fact younger than their actual age in years!
Summary

The loss of brain plasticity is at the heart of age-related loss of cognitive function. As our brains lose flexibility, we lose the ability to learn new concepts, to make sharp judgments, and to develop new skills.

Loss of brain plasticity is implicated in both the "natural" loss of brain function with aging and with accelerated cognitive decline as seen in Alzheimer's and other neurodegenerative diseases.

Restoring brain plasticity has become a major focus of neuroscientists aiming to slow or eliminate the loss of brain function over time.

Studies show that boosting brain magnesium levels dramatically renews the ability of brain cells and, in animals, to form new memories and discriminate between existing ones. But conventional magnesium supplements are inadequately delivered to brain tissue, challenging our ability to effectively raise brain magnesium levels.

The development of magnesium-L-threonate appears to have shattered that barrier. Studies show that this compound enters brain tissue more effectively than other magnesium preparations, and is significantly more effective at restoring memory functions and brain plasticity in numerous animal models, including those of Alzheimer's disease.

Recent new human data on magnesium-L-threonate shows promising results in older adults with cognitive impairment. Those interested in preventing cognitive decline and in restoring active, flexible brains should consider daily supplementation with magnesium-L-threonate. No other magnesium preparation comes close to its performance.

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

References

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### References

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MAJOR ADVANCE IN SCREENING AND TREATING PROSTATE CANCER

JUNE 2016
Countless numbers of men are alive today because a PSA blood test identified cancer early enough for curative therapies to be deployed. Some famous people diagnosed early with prostate cancer who continued to live productive lives include:

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<td>Colin Powell</td>
<td>2003 at age 66</td>
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What we don’t know is how many treatment side effects, such as urinary incontinence, impotence, and chronic pain, these men may be dealing with. Because as many as 1 in 7 American men will be diagnosed with prostate cancer, Life Extension® has sought to identify more effective and less side-effect-prone treatments. Our objective is to find innovative and compassionate doctors who are achieving impressive results without resorting to radical prostatectomy surgery and radiation.

This article describes a physician/scientist who has spent decades perfecting a minimally invasive diagnostic and treatment approach that may revolutionize conventional prostate cancer treatment.
**A Better Technology**
Gary Onik, MD, is a visionary prostate expert and inventor who thinks that this dilemma represents a false dichotomy. Using techniques Dr. Onik and his colleagues have developed over the past decade, it is now possible for a man to undergo the rough equivalent of a “lumpectomy” of the prostate. This procedure allows a urologist to precisely identify a tumor (or tumors) within a three-dimensional matrix of the prostate gland, then selectively destroy tissue only where malignant cells are documented.

Dr. Onik and his team recently reported the results of a 10-year average follow-up of 70 study participants that demonstrated superior results in medium- and high-risk patients compared with standard treatment of the whole prostate gland. Remarkably, Dr. Onik’s approach was equally successful at preventing recurrence for all risk categories of cancer, compared with standard treatments that are so side-effect prone.

**The Dilemma...**
Men have every reason to be confused about prostate cancer screening and treatment. On one hand, experts tell us that prostate cancer is the second most common malignancy in men, as well as the second leading cause of cancer-related death in modern industrialized countries.

On the other hand, equally reliable sources tell us that prostate cancer screening is overused and can lead to a diagnosis of trivial cancers, resulting in excessive biopsies and surgical procedures.

So what is a man to do? Skip blood tests and take a chance with a potential killer? Or undergo screening with its possibility for a false alarm, with side-effect risks.

Modern medicine has arrived at this quandary with the best intentions. Advances in screening tests have enabled doctors to detect cancers at earlier stages. That’s generally considered a good thing in oncology circles.

What’s happened is that small-size/non-aggressive prostate cancers that pose only minimal risk can now be detected. But treatment technology has not kept up with diagnostics, leaving physicians with surprisingly crude techniques for biopsy and removal of suspect cancers. Virtually all conventional approaches to prostate cancer incur risk of incontinence and impotence, in addition to the possibility that a serious tumor mass could still be missed.

These concerns shift the benefit-risk calculation sharply and have caused some men and their physicians to take a dangerously conservative position, leaving open the possibility that they might be missing deadly cancers. These cancers could be amenable to treatment if we could only locate them with certainty and treat with sufficient precision to avert serious complications.

**Delineating the PSA Quandary**
Widespread use of blood screening for PSA has permitted very early detection of prostate cancers. Too early, some experts believe, raising concerns that many cancers now being diagnosed are too trivial to justify a radical prostate operation, with its inherent risks to continence and potency. Yet at the same time, a large proportion of men are reluctant to accept the idea of “watchful waiting” knowing that their bodies harbor a malignancy. Most men prefer a more active role in managing their own health.

This situation has led to a quandary in which neither patients nor physicians feel comfortable, yet official policy recommends against routine PSA screening.

This quandary may become moot if more patients and physicians recognize the value of **optimized focal therapy for prostate cancer**, using the tools and protocols developed by Dr. Onik and his team. By making prostate cancer detection more precise, and removing only the tiny amount of prostate tissue that has turned malignant, concerns on both sides of the PSA debate can be eliminated.

Equally important is evidence that this novel procedure may generate a localized reaction that destroys residual peripheral cancer cells, while generating a systemic immune response against malignant cells that have escaped the prostate gland.
Introducing “Lumpectomy” for Men

Dr. Onik has written that “prostate cancer in men raises many of the same issues that breast cancer does in women. Complications of prostate cancer treatment, including impotence and incontinence, affect the self-image and psyche of a man no less than does the loss of a breast in a woman.”

It was this insight that led Dr. Onik and his team to explore the possibility of a male version of lumpectomy. In other words, selective identification of a prostate tumor’s location and precise removal of the diseased tissue while sparing surrounding structures and their important functions.

To understand the promise of Dr. Onik’s “lumpectomy” approach, one has to grasp the anatomical challenges posed by prostate cancer. The prostate gland, unlike the breast, is in an extremely hard-to-reach location. Bounded by bone, bladder, and rectum, and containing the urine- and semen-carrying urethra, the gland cannot readily be exposed and directly examined.

This is further complicated by the fact that most men with early prostate cancer have no symptoms that might help guide or localize therapy. There is no palpable “lump” detected by patient. Instead, the concern about cancer is raised either on a rectal examination by a skilled clinician or by an elevated level of PSA in the blood.

Neither technique, of course, provides information about the potential severity or extent of any tumor found. To get that evidence, doctors turn to an ultrasound procedure, typically followed by a needle biopsy (tissue sampling) under ultrasound guidance.

The most common approach is called transrectal ultrasound biopsy. The main problem with this technique is that it’s inadequate for assuring that all of the tumor will be detected, and misses up to 46% of significant (high-grade) cancers. Studies have shown that transrectal ultrasound biopsies bear little resemblance to the actual pathological findings when the entire gland is removed, which clearly indicates room for improvement.

Numerous sources suggest that the use of multiparametric MRI is useful for identifying and locating significant cancer in the prostate. While indications suggest that the use of the multiparametric MRI technology is more accurate than a transrectal ultrasound biopsy in the identification of cancer, findings have shown that its sensitivity for picking up clinically significant tumors in the peripheral zone (or outer area) of the prostate was 85% and just 62% in the transition zone (or innermost section) of the prostate.

What You Need to Know

Breakthrough Prostate Cancer Testing and Treatment

- Prostate cancer is a common and sometimes deadly cancer.
- Early detection through screening and specific therapy is standard oncological practice for most malignancies.
- A 2008 report questioned routine blood testing for evidence of prostate cancer in men over 50. Physicians and patients have been at a loss for the best way forward in balancing the risk of unnecessary treatment against that of late diagnosis of a malignancy.
- Thanks to the work of Dr. Gary Onik and his team, that dilemma is largely out of date.
- Dr. Onik combines precise, three-dimensional prostate mapping biopsy with equally precise three-dimensional destruction of tumor by freezing, to produce results equivalent to or better than standard approaches but with sharply reduced post-surgical side effects.
- Men should discuss optimized focal therapy for prostate cancer with their physicians, to allow for routine PSA testing and proper, lower side-effect risk treatment.
Not surprisingly, treatments based on an inadequate diagnostic technique have a high likelihood of being inadequate themselves, either overtreating a cancer that is in fact trivial or missing some parts of a viable tumor that will lead to a recurrence. In part to avoid those outcomes, current treatments target most or all of the prostate gland, to ensure that as much tumor as possible will be removed (such as radical prostatectomy).

Thus, inaccurate diagnoses coupled with heavy-handed, one-size-fits-all surgical approaches incur substantial risk of damaging important nerves and other structures that can potentially leave a man with urinary or erectile dysfunction, without necessarily providing a cure of the cancer itself.8

More Accurate Detection and Diagnosis Changes Tumor Management

In the early 2000s, Dr. Onik and his team began exploring better techniques for prostate cancer detection, using an array of emerging high-technology devices in the hope that they could improve on the performance of standard transrectal ultrasound guided prostate biopsies.

First, they began using a highly accurate means of examining the prostate gland in three dimension and obtaining biopsy specimens from the entire bulk of the gland. A technique called three-dimensional prostate mapping biopsy, 3D-PMB, provides more accurate information about a tumor’s extent and location compared with a standard transrectal ultrasound biopsy.12,15

This three-dimensional prostate mapping biopsy is extraordinarily accurate and painless, and it does not involve puncturing the rectal wall. This sterile procedure greatly lowers the chance for life-threatening sepsis and debilitating prostatitis, which are sometimes the result of standard transrectal ultrasound biopsies.

By 2009, with five years of experience using three-dimensional prostate mapping biopsy, Dr. Onik’s team published a study of men who had previously undergone a standard biopsy using transrectal ultrasound guidance and whose results showed tumor on only one side of the gland.12 These men were considering “conservative” management, meaning that they were likely to receive no further treatment while being carefully observed.

As a result of performing the three-dimensional prostate mapping biopsy on the 180 men who were identified as having cancer on one side of the gland by the standard transrectal ultrasound biopsy, Dr. Onik identified:

- 110 patients (61.1%) who had tumor on both sides
- 41 patients (22.7%) whose tumor grade (severity) increased from a low-grade score to an intermediate-grade score
- 35 patients (19.4%) who were found to have cancer dangerously close to nerve and blood vessel bundles

Overall, 69.4% of the men originally diagnosed by transrectal ultrasound to have low-grade, one-sided tumors meriting just “watchful waiting” (active surveillance) turned out to have at least one finding that might have changed their cancer management plan to a more aggressive approach.12

Dr. Onik’s findings are being corroborated by other inventive physicians using enhanced imaging techniques.14

Optimized Focal Therapy for Prostate Cancer

Having clearly identified the more accurate higher-resolution diagnostic properties of three-dimensional prostate mapping biopsy, Dr. Onik and his team went on to study the results of treating men according to its results. To do so, they used an approach called optimized focal therapy7.

“Focal” is medically defined as “localized.” So “focal ablation” in this context refers to precise localized removal of malignant prostate tissues.
In this technique, patients first undergo biopsies by *three-dimensional prostate mapping* to accurately locate the tumor or tumors in three-dimensional imaging of the prostate gland. The location of each specimen is carefully noted and correlated with the pathology report for each site. This allows physicians to see not only the three-dimensional extent of the tumor but also its most concerning areas.

Next, using their detailed three-dimensional map of each man’s prostate, the team returns to the diagnostic suite armed with a *cryoablation* device. Cryoablation means “destruction by cold.” It is a technique widely used for removal of focal areas of diseased tissue while assuring minimal collateral damage to adjacent healthy structures (anyone who has had a wart “burned off” with liquid nitrogen has undergone a simplified version of this technique).

Dr. Onik’s team used their three-dimensional map of tumor extent and severity to guide their ablation tool, aiming to destroy all known areas of tumor while sparing vital structures such as nerve/blood vessel bundles. They carefully control the freezing temperatures to assure that they deliver the precisely correct amount of tissue-killing freeze to each area of the tumor.

**Findings from 10-Year Study Using Focal Ablation Therapy**

A long-term clinical trial was initiated to ascertain the accuracy, safety, and efficacy of *focal cryoablation* therapy using precise *three-dimensional prostate mapping biopsy*.

Dr. Onik’s team treated 70 men in this fashion, giving them a blood test for the PSA tumor marker at quarterly intervals for two years, then every six months. Men were determined to be “biochemically disease free” when their PSA level stabilized, indicating no actively growing tumor.

Additional follow-up determined the degree to which each man’s potency and urinary continence had been affected, to identify common side effects of prostate surgery.

By the end of the study, Dr. Onik had data for an average of over 10 years on 70 subjects aged 45 to 77 years at the time of the procedure, an ample number for analysis.

Overall, 66 men survived to the end of the study, and none died of prostate cancer, yielding a “disease-specific” survival rate of 100%. Biochemical disease-free survival (proportion of men achieving PSA stability) was 89% overall.

Men with prostate cancer are categorized according to risk level based on the characteristics of the cancer; the Gleason score (a measure of the aggressiveness of the cancer), the stage (extent of the cancer), and the PSA level. With conventional treatments, patients with low-risk cancer have an approximate 85% long-term disease-free survival rate while men at high risk have a success rate that falls to 45%. Surprisingly, with the focal *cryoablation* treatment, there seems to be no difference in patient results based on risk level.

Biochemical disease-free survival was 90% in men categorized as low-risk, 88% in medium-risk, and 89% in high-risk men, showing no statistically significant difference among the risk levels. In other words, unlike existing therapies, all men had superb results regardless of their original risk category.

Dr. Onik’s approach of focal cryoablation represents the first time that statistically identical survival rates were obtained across all cancer risk levels through use of a localized, minimally invasive prostate cancer treatment. Importantly, the use of the *three-dimensional prostate mapping biopsy* also lowered the local recurrence (patients who needed to be retreated due to more cancer found within the gland) to just 4%.

Complications occurred with extremely low frequency after optimized focal therapy: A full 100% of men retained urinary continence, requiring no absorbent pad use, while 94% of men remained normally potent after the first treatment.

There are a number of potential reasons for these results:

“A cryoimmunological response must also be considered for these results in medium- and high-risk patients,” wrote Dr. Onik and colleagues in a paper published in the Journal of Men’s Health. “Based on the human and animal data, it is likely that in some patients there is exposure of tumor antigens at the time of the procedure that acts as an in vivo cancer vaccine, preventing later metastasis from occurring.”

Said differently, as the prostate tumor mass is being damaged/destroyed by the cryoablation (freezing) technique, barriers to recognition by the immune system are broken down. This can enable immune cells to take notice of the tumor’s genetic makeup and initiate attack
against malignant lesions in other parts of the body that have spread or metastasized beyond the prostate capsule. This immune-boosting phenomenon has been observed in response to laser and certain localized radiation procedures.17-20 Interestingly, another medical team utilizing cryoablation reported the spontaneous remission of metastatic prostate cancer after freezing of the primary tumor for palliation.21

Dr. Onik’s team identified another mechanism by which focal cryoablation may be effective in treating malignant disease outside the prostate capsule. They wrote: “Focal cryoablation has an ability to treat extra-capsular disease. Patients at high risk for positive margins at prostatectomy have a better chance of local control with ablative therapy.”

### Comparative Studies

Optimized focal therapy appears to be superior to several other modern techniques at producing biological disease-free survival. In one study of prostate patients treated with specialized radiation therapy, 10-year biochemical disease-free survival was 81% for low-risk, 78% for medium-risk, and just 62% for high-risk men, using identical criteria for success.22

In a study of robotic radical prostate removal—considered by many to be the “gold standard” of prostate cancer treatment—the biochemical disease-free survival rate in all patients was just 72%, even when measured at only five years, rather than 10 years, after the procedure.23

That study also found substantial amounts of cancer on the margins of the removed tissue—indicating some cancer remained—in 23% of low-risk, 29% of medium-risk, and 42% in high-risk patients.23 These patients would, under current guidelines, be offered additional radiation therapy, which adds both risk and cost to an already complicated procedure.24

Thus, Dr. Onik’s team appears to have realized their dream of performing the equivalent of a lumpectomy in men with prostate cancer. They identified the extent and severity of the disease in a large group of men using three-dimensional mapping and biopsies, then used that information to selectively destroy tissue in a fashion personalized for each individual patient. Their results are equivalent to more radical surgical approaches in low-risk patients, and superior to those in medium- and high-risk patients for achieving cancer-free status.7

### An Answer to the PSA Screening Quandary

Because of these compelling results, Dr. Onik has suggested that the debate regarding PSA screening can easily be resolved.

That quandary was first produced by the United States Preventive Services Task Force, which in 2008 recommended discontinuation of routine PSA blood testing in most men, citing the emotional turmoil and potential for overtreatment raised by excessively early detection of small prostate tumors.25

But that United States Preventive Services Task Force recommendation made the assumption that prostate cancer diagnosis and treatment were static and unchanging, making the risk-benefit choice in some cases favor watchful waiting rather than aggressive treatment.

With the dawn of the era of optimized focal therapy for prostate cancer, the calculus has changed. Tumors can now be identified, localized, and staged with unprecedented accuracy, using three-dimensional mapping and biopsies. Focal cryoablation based on the three-dimensional map allows each man’s therapy to be personally customized, resulting in higher rates of disease elimination with few of the complications that spurred the task force’s fears.

Dr. Onik firmly believes that, with the availability of these enhanced techniques of diagnosis and treatment, all men should once again undergo routine PSA screening and digital rectal exam, with much less fear of unintended consequences if a suspicious lesion is discovered.

In his opinion, there never was anything wrong with the PSA test. It was simply being applied in a group of patients for whom tailored therapy was not available,
resulting in a one-size-fits-all approach that did no favors for many men. But that argument can now be convincingly retired, Dr. Onik says, with the net result that more men will receive more appropriate therapy for their own specific prostate cancers.

Although the results of the Onik study are impressive, additional confirmatory studies will be required for widespread acceptance.

Summary

Ever since the 2008 publication of the United States Preventive Services Task Force report condemning routine use of PSA testing to detect early prostate cancers, physicians and their patients have been at in a quandary regarding the best approach for detection and treatment of prostate cancer.

The options seemed limited to one of two extremes: Test early and run the risk of unnecessarily invasive surgery and its performance-related side effects, or refrain from testing until obvious symptoms arise, risking the chance of more advanced and potentially fatal cancer.

A proper balance has been restored with an approach championed by Gary Onik, MD. Men can now return to regular PSA screening, and, if found to be at risk of harboring a prostate tumor, undergo precise three-dimensional prostate mapping biopsy followed by equally precise cryoablation of just the malignant tissue, largely sparing the vital structures needed to sustain potency and continence.

As discussed in the opening editorial in this month’s issue of Life Extension® magazine, there are also opportunities for men with a rising PSA to reverse it via modifications to their diet, lifestyle, supplement, hormone, and medication program.

Any man over 40 years old should include the PSA test with their annual screening for modifiable disease risk factors. If the result comes back very high, or if there is a consistent rise in PSA readings over time, the use of three-dimensional prostate mapping biopsy should be considered for diagnosis to assess if one has prostate cancer.

If the biopsy comes back positive, then focal cryoablation therapy can be performed during the same diagnostic procedure as a potential curative treatment.

Where to Inquire about Three-Dimensional Guided Diagnosis and Cryoablation

The International Strategic Cancer Alliance (ISCA) provides comprehensive services to their clients and assists them in locating and receiving the best diagnostics and treatment options anywhere in the world.

This article is an example of a major advance in prostate screening and treatment by Gary Onik, MD, which ISCA is excited to bring to the readers of Life Extension® magazine. ISCA is prepared to help those who want further information about Dr. Onik’s approach. For more information, please call ISCA at 1-610-628-3419.
For more information regarding Dr. Onik’s approach for prostate cancer, please call ISCA at 1-610-628-3419.

References
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References
By the time men reach their 50s or 60s, it is almost inevitable that they will experience difficulties related to their prostate gland.

Common symptoms include more frequent need to urinate, waking up during the night to “go,” or trouble even “going” at all.

These signs should not be ignored or overlooked as they can indicate serious problems, including benign prostatic hyperplasia (BPH), prostatitis, and even prostate cancer.

Fortunately, a number of natural extracts have proven value in preventing, and often reversing, symptoms of benign prostatic hyperplasia and chronic prostatitis with a high safety profile.

There is also evidence that certain supplements can help prevent prostate cancer, and even slow the rate of cancer progression if it does occur.

This article supplies essential information for men wishing to prevent prostate trouble—and solutions for those with existing issues.
The Aging Prostate Gland
The three most common prostate conditions are:

1. **Benign prostatic hyperplasia**
2. **Prostatitis** (inflammation of prostate)
3. **Prostate cancer**

These conditions often produce similar symptoms in their early stages, making it difficult to differentiate between them. These common symptoms can include the following:

- More frequent need to urinate
- More urgent need to urinate
- Decreased urine flow or dribbling
- Frequent nighttime awakening to urinate
- Burning with urination

The reason prostate problems are likely to cause trouble with the lower urinary tract has to do with the prostate's location. The prostate is located between the lower part of the bladder and the rectum. It surrounds the internal part of the urethra, the tube that carries urine from the bladder to the end of the penis.

When the prostate swells, whether because of benign prostatic hyperplasia, prostate cancer, or prostatitis, it narrows the urethra, making it difficult for urine to pass freely from the bladder. As the gland continues to grow, it can produce sufficient blockage to lead to difficulty urinating, and even urinary retention, which in turn can result in bladder and kidney infections.

While most prostate problems can be readily treated—and the vast majority are not cancer-related—it is important to seek medical attention as soon as a symptom arises.\(^1\)

Researchers have identified a number of nutrients that have been found to alleviate many of the unpleasant prostate symptoms. Let’s look at the data on some of the best-known and most effective supplements that can help men optimize their prostate health.

**Nature’s Solutions for Benign Prostatic Hyperplasia**

**Benign prostatic hyperplasia** is an enlargement of the prostate gland. Approximately **25%** of men in their 40s have benign prostatic hyperplasia, with a startling **80%** of men in their 70s suffering from the condition.\(^2\)

The good news is that benign prostatic hyperplasia (BPH) is not cancerous. It is a major risk factor for sexual dysfunction. Conventional treatments for benign prostatic hyperplasia can cause unpleasant side effects that are also a cause for sexual dysfunction.\(^3\)

Fortunately, studies have shown that certain nutrients help alleviate many of the symptoms associated with benign prostatic hyperplasia and can significantly improve quality of life as a result.

**Saw Palmetto**

Saw palmetto is one of the most well-known natural treatments for prostate problems. Recent studies suggest that saw palmetto may also be beneficial for chronic prostatitis, prevention of prostate cancer, and even sexual dysfunction.\(^3,4\)

There is evidence to suggest that saw palmetto has similar efficacy to finasteride (Proscar\(®\)) and tamsulosin (Flomax\(®\)), two medications used to treat benign prostatic hyperplasia.\(^3,5,6\) Of even greater interest, a lower incidence of associated sexual dysfunction was seen in men supplemented with saw palmetto compared to those given pharmaceuticals.\(^3\)

A 2013 study demonstrated that elderly men treated with **320 mg** of saw palmetto extract daily for eight weeks not only experienced a significant **52%** improvement in their **International Prostate Symptom Score (IPSS)**, the standard tool used to measure the severity of benign prostatic hyperplasia symptoms, but also had a significant **40%** improvement in sexual dysfunction scores!\(^3\)

A host of other studies compellingly demonstrate the impact of saw palmetto extract on symptoms of benign prostatic hyperplasia. Two large meta-analyses including more than 7,000 men from 38 studies showed that saw palmetto extracts produced
significant improvements in the International Prostate Symptom Score, reductions in frequency of nighttime urinations, and improvements in peak urine flow rates. Indeed, saw palmetto produced similar improvements in urinary symptoms and urinary flow compared to the drug finasteride, but with fewer adverse effects.

Based on all of these studies, a 2015 review article concluded that, while drug therapy might be most effective for moderate to severe benign prostatic hyperplasia, herbal medications including saw palmetto are useful for men with mild to moderate symptoms.

Not all studies demonstrate desired relief with saw palmetto, which is why combining it with additional nutrients is the preferred choice for most aging males.

**Stinging Nettle Root**

*Stinging nettle root* (*Urtica dioica*) has been widely used as therapy for benign prostatic hyperplasia. Both human and animal studies have shown that nettle root extract is effective not only in relieving benign prostatic hyperplasia *symptoms*, but also in shrinking the *size* of the prostate gland.

A study on nettle root extract was shown to improve lower urinary tract symptoms significantly better than placebo, with marked improvements in the International Prostate Symptom Scores, increases in peak urinary flow rates, and reductions in residual urine volume remaining in the bladder.

The most compelling findings show that the combination of nettle root extract and saw palmetto extract can produce improvements similar to those of prescription benign prostatic hyperplasia medications with far fewer adverse events. Of particular interest, a study involving 257 elderly men with benign prostatic hyperplasia found that the combination of the extracts reduced the International Prostate Symptom Scores by 53%, improve urinary flow by 19%, and reduced residual urine volume by 44% when compared to placebo.

In addition, repeated studies have revealed that saw palmetto, combined with nettle extract, can reduce nighttime urination by one episode per night, a substantial and significant difference.
Pygeum Africanum

*Pygeum africanum* is a plum tree from tropical Africa. It has been in widespread use in Central and Eastern Europe for decades and numerous human studies have demonstrated the clinical efficacy of *pygeum* in the management of mild to moderate benign prostatic hyperplasia. At typical doses of 100 mg per day, the extract produces significant improvements in International Prostate Symptom Scores of 38% to 46%, reductions in frequency of nighttime urination of 32%, and increases in peak urinary flow rates of 16% to 19%. Quality of life, an important measure for this disruptive condition, was increased by about 30% in two studies.

A meta-analysis of 18 randomized, controlled trials involving 1,562 men has shown similar results, with overall reduction in nocturnal urination of 19% and increased urine flow of 23%. It also showed that men who took *pygeum* had an important reduction in the volume of urine remaining in the bladder after urination, a major risk factor for urinary tract infections. In that analysis, men using *pygeum* extract were more than twice as likely as those using placebo to report an overall improvement in urinary tract symptoms.

Symptoms of Prostate Problems

Regardless of the cause, symptoms of prostate enlargement that can signal prostatitis, benign prostatic hyperplasia, or prostate cancer are similar in their early stages. They include the following:

- More frequent need to urinate
- More urgent need to urinate
- Decreased urine flow or dribbling
- Frequent nighttime awakening to urinate
- Burning with urination

Symptoms of prostatitis include, in addition to those of general prostate trouble:

- A strong and frequent urge to urinate, even when only a small amount of urine is present
- Chills, fever, low back pain, or body aches
- Pain in the lower abdomen, the groin area, or behind the scrotum
- Pressure or pain in the rectum
- Discharge from the urethra (urinary opening) during bowel movements
- Throbbing in the genital and/or rectal area
- Problems with sexuality and loss of drive
- Painful ejaculation

Symptoms of benign prostatic hyperplasia include, in addition to those of general prostate trouble:

- Hesitation or difficulty starting a urine stream
- A weak or slow stream of urine, or just a dribble of urine
- Frequent urination, especially at night
- A sense of incomplete emptying of the bladder
- Repeated stopping and starting during a single urination
- Pushing or straining to complete bladder emptying

The symptoms of prostate cancer are often difficult to distinguish from those of benign prostatic hyperplasia. That means that men with any such symptoms should see their physicians early to allow for proper diagnosis and treatment. Annual PSA screening to detect early-stage prostate cancer is highly recommended.
Additional Nutrients for Benign Prostatic Hyperplasia

Pumpkin seed. Studies have shown that supplementation with pumpkin seed led to clinically relevant reductions in the International Prostate Symptom Scores compared with placebo after three to 12 months. One of these studies also showed that the combination of pumpkin seed oil and saw palmetto improved quality of life scores and showed a 41.7% reduction on serum PSA levels at the end of the study when compared to baseline.

Pollen extracts. A meta-analysis of 444 men demonstrated that rye grass pollen extract significantly improved self-rated urinary symptoms in men with benign prostatic hyperplasia. Men in this study were also more than twice as likely to report improvement in nocturnal urination compared with placebo, and no side effects were reported.

Flaxseed. Flaxseed is a rich source of dietary lignans. In the intestine, they are converted by bacteria into other bioactive compounds, particularly enterolactone. A human study on dietary flaxseed lignan extract demonstrated significant reductions in the International Prostate Symptom Scores and improvements in quality of life in men with benign prostatic hyperplasia.

Prostate Cancer Prevention

Prostate cancer is the second most common malignancy experienced by men, with more than 180,000 American men diagnosed a year, according to the American Cancer Society.

While it can be life threatening, most men do not die from prostate cancer. The five-, 10-, and 15-year survival rates for men diagnosed with prostate cancer are 99%, 98%, and 95% respectively. In fact, it is estimated that more than 2.9 million American men are living with the disease right now. In addition, it is among the most readily prevented cancers because it tends to grow very slowly and because nutritional approaches to prevention can be highly effective.

Let’s take a look at five of the most effective nutrients against prostate cancer.

Lycopene

A nutrient with significant potential effects against prostate cancer is lycopene, a bright red carotenoid pigment abundant in tomatoes and other red fruits and vegetables.

High consumption of lycopene has been associated with a reduced risk of developing prostate cancer—and also with a reduced risk of dying from the disease. Among men with more aggressive prostate cancers, above-average lycopene consumption was associated with a 59% reduction in the risk of dying from the disease!

Higher blood lycopene levels have also been consistently associated with reduced prostate cancer risk.

Additionally, lycopene inhibits the inflammatory processes that promote prostate (and many other) cancers by suppressing critical “master regulatory molecules” such as nuclear factor-kappa beta (NFkB).

Pygeum Africanum

In addition to combating many of the symptoms of benign prostatic hyperplasia, pygeum africanum has shown early evidence of potent anticancer effects.

One study found that when mice bred to have prostate cancers were treated with pygeum extract, they had significantly lower incidence of developing the malignancy. This same study showed that when
applied directly to prostate cancer cells in culture, pygeum extract had numerous benefits, including inhibiting cell proliferation, inducing apoptosis, and binding to androgen receptors used by the tumor to sustain growth.17

Another important study showed that serum from a man using pygeum extract could decrease the proliferation of prostate cells in culture and upregulated genes involved in tumor suppression.34

Three Additional Nutrients to Fight Prostate Cancer

Boswellia extract. Numerous studies on cultured prostate cancer cells have shown that boswellia extract induces tumor death by apoptosis.35-38 Other studies also show that its components may prevent tumor growth by blocking the androgen (male hormone) receptors39 and by inhibiting the formation of new blood vessels (angiogenesis), further depriving tumors of nutrients.36

Flaxseed. Studies confirmed that flaxseed supplementation lowers PSA levels and significantly reduces the proliferation of normal prostate cells and prostate cancer cells.40,41 In a clinical study, supplementation with flaxseed generated favorable reductions in tumor proliferation rates in men with prostate cancer in as little as 30 days.41

Boron. According to one study, men with the highest dietary boron intakes have a 54% lower risk of developing prostate cancer compared to those with the lowest intake.42 Boron is known to block certain growth factors necessary for tumor development, and it has also been shown to inhibit the enzymatic action of PSA, which releases those same growth factors from their transport proteins.43 In an animal study, human prostate cancers implanted in mice were smaller by 38% following low-dose boron supplementation, while serum PSA levels fell 89%.43

Lycopene May Slow Cancer Progression

Most men by middle age have been offered a blood test for prostate-specific antigen (PSA), which is produced in excessive amounts by prostate cancers and can be effectively used to help identify early-stage malignancy. PSA can also elevate in response to prostatitis and benign prostate enlargement.

Lycopene, the red pigment from tomatoes and other red fruits and vegetables, is one of the few compounds convincingly demonstrated to slow the rise of PSA in men with prostate cancer.

One study showed that, for men with advanced tumors, lycopene plus removal of the testes (to deprive the tumor of growth-promoting male hormones) was superior to surgery alone, with a significant difference in PSA levels by two years after the procedure.51 Men in this study also had fewer secondary tumors, better relief from bone pain, improved urine flow, and, most importantly, an improved survival rate compared with those undergoing testes removal only.

In another study of men with prostate cancer, 10 mg of lycopene per day significantly slowed the rate of PSA rise in 70% of treated men, and in 21%, turned the rise into a decline.52

Since PSA is now known to have direct contributions to prostate cancer growth in addition to serving as a marker for the disease,43 it seems sensible for men, even without known cancers, to supplement with lycopene as a way of suppressing this important risk factor.

Relief for Chronic Prostatitis

Chronic prostatitis is a term used to describe ongoing inflammation of the prostate gland, usually in the absence of any known infection.7 It is often found as part of a condition known as chronic prostatitis/chronic pelvic pain syndrome, both of which are common in older men and unfortunately difficult to treat with standard medication, leaving men who suffer from this condition in considerable misery.44-46

Fortunately, studies show that rye grass pollen extract may be a viable approach to treating this challenging condition.
One early study demonstrated that men assigned to receive rye grass pollen extract showed significant improvements in reported pain and quality of life. They also showed improvements on total scores on the NIH Chronic Prostatitis Symptom Index scale, compared with placebo.\(^{47}\)

Subsequent studies found similar results, with more supplemented subjects reporting significant improvements in quality of life and symptom scores.\(^{48,49}\)

None of these studies identified significant side effects, which suggests that rye grass pollen is both safe and effective in the treatment of chronic prostatitis, a stubborn condition that has resisted other treatment approaches.

**Summary**

The human prostate is a small gland with an enormous impact on a man’s health. Most of its functions are important in reproductive activity, but problems tend to arise later in life.

The most common prostate problems include benign prostatic hyperplasia, chronic prostatitis, and prostate cancer. Treatments, when available, vary in effectiveness and carry considerable side effects.

A large handful of dietary supplements has shown real promise in reducing the impact of prostate disease. While no single supplement can provide complete coverage against potential problems, those discussed here have overlapping mechanisms of action. This suggests that, taken in combination, they can contribute to reducing the risk of prostate disease, and many have been shown to help reverse the most troubling symptoms.

Starting a comprehensive prostate health supplement regimen is the smart thing to do, even (and especially) before symptoms arise.

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**Drugs to Treat Benign Prostate Hypertrophy (BPH) and Reduce Prostate Cancer Risk**

Life Extension\(^*\) has long advocated the use of certain prescription drugs to further reduce symptoms of benign prostatic hyperplasia, shrink enlarged prostate glands, and lower prostate cancer risk.

One class of drugs that aging men should consider are 5-alpha reductase inhibitors that function to decrease the conversion of testosterone into more powerful dihydrotestosterone (DHT).\(^{2}\)

We have published meticulous reviews showing the value with the judicious use of Avodart\(^*\) (dutasteride) or Proscar\(^*\) (finasteride). A small percentage of men suffer sexual side effects from these medications, but they should be considered in addition to nutrients described in this article when symptoms of benign prostatic hyperplasia do not sufficiently resolve. To review what we have previously published about Avodart\(^*\) or Proscar\(^*\) in the prevention of prostate cancer, log on to LifeExtension.com/prostate

A drug that was extensively advertised on television that can reduce benign prostatic hyperplasia symptoms by facilitating complete emptying of the bladder is Flomax\(^*\), available as a generic under the name tamsulosin. The urinary/sexual side effects stated on the television commercials sounded hideous, yet we hear from men using this drug that they do not encounter these side effects and attain significant benefit.

So if one is troubled with benign prostatic hyperplasia symptoms that are not sufficiently resolved with nutrients and 5-alpha reductase inhibitors, it makes sense to try tamsulosin. If side effects outweigh the benefits, then discontinue this drug. One side effect from this medication is that it can lower blood pressure.\(^{50}\)

Life Extension\(^*\) strongly recommends that all people purchase a low-cost at-home blood pressure monitor so they can check themselves when they try new medication and what effect it is having on their blood pressure.

Most natural health publications demonize most all prescription drugs because so many of them have horrific side effects and minimal efficacy. Life Extension\(^*\) has published numerous articles exposing fraudulent approvals of deadly drugs that should be avoided.

What distinguishes Life Extension\(^*\) is our analysis of data about prescription drugs whose beneficial effects outweigh side effect risks. Metformin is one example of a prescription drug that when properly used, may have profound age-delaying benefits.

Prostate prescription drugs, likewise, can provide additional benefits for men whose benign prostatic hyperplasia is not completely resolved with natural approaches.
SOLUTIONS FOR COMMON PROSTATE PROBLEMS

References


Milk thistle extract—rich in silymarin—is one of nature’s most powerful weapons to support liver health. Scientific studies demonstrate silymarin’s ability to provide potent protection for your liver.¹²

Life Extension’s European Milk Thistle contains standardized, top-grade potencies of silymarin, silybin, isosilybin A, and isosilybin B, providing a full spectrum of liver-supportive compounds. This unique formula includes phosphatidylcholine, a nutrient that promotes better absorption of milk thistle extract.³

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

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To order European Milk Thistle Advanced Phospholipid Delivery, call 1-800-544-4440 or visit www.LifeExtension.com

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SILIPHOS® is a registered trademark of Indena S.p.A., Italy.
Ultra Natural Prostate is scientifically designed to support healthy prostate structure and function, as well as a more youthful urinary flow.

Ultra Natural Prostate provides a comprehensive blend of nutrients to combat issues associated with the aging prostate gland.

Ultra Natural Prostate provides validated potencies of the following nutrients:

- Standardized lignans
- Beta-sitosterol
- AprèsFlex® (an extract of Boswellia)
- Graminex® Flower Pollen Extract™
- Saw palmetto CO₂ Extract
- Lycopene
- Pygeum
- Phospholipids
- Pumpkin seed oil
- Boron
- Stinging and dwarf nettle root

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Topical VITAMIN C for Skin Rejuvenation

With advancing age, your skin progressively loses vitamin C.¹ That spells trouble for the skin’s underlying architecture, resulting in visible wrinkles, age spots, and fine lines.

Vitamin C supports firm and youthful skin by boosting collagen synthesis,²,³ decreasing photodamage,⁴,⁵ and exerting anti-inflammatory activity.⁶

In this article, you will learn about three of the most stable forms of vitamin C—and how their diverse biological activities in the skin protect against photoaging and common skin disorders to leave behind a more youthful appearance.
**More Stabilized Forms of Vitamin C**

Since humans lack the enzyme necessary for synthesizing vitamin C, they must obtain it through oral ingestion or topical application. Topical application has shown to be superior for replenishing skin concentrations of vitamin C. Scientists have identified three vitamin C derivatives—magnesium ascorbyl phosphate, sodium ascorbyl phosphate, and ascorbyl glucoside—with improved stability that efficiently convert to L-ascorbic acid in the skin to leave it firmer, healthier, and more youthful.

**Prevent and Repair Sun-Damaged Skin**

Chronic exposure to the damaging rays of the sun induces unfavorable changes to the skin’s structural framework, leading to premature aging visible as wrinkles, age spots, and spider veins. Research indicates that all three stable forms of vitamin C protect against sun-induced aging (photoaging) by:

- **Scavenging reactive oxygen species** that increase the expression of enzymes responsible for breaking down collagen and elastin—the proteins comprising most of the structural framework that keeps skin firm and resilient.

- **Inhibiting lipid peroxidation** that damages membranes of the skin cells and alters their functional integrity.

- **Reducing the inflammatory response** to ultraviolet radiation that triggers DNA damage, programmed cell death by apoptosis, and immunosuppression.

In addition to protecting against the harmful effects of ultraviolet rays, these three forms of vitamin C also initiate the repair process of sun-damaged skin. They are broken down to L-ascorbic acid, which acts as a co-factor in enzymatic reactions responsible for stimulating new production of collagen that boosts the skin’s healing capacity.

Owing to its unique molecular structure, each form of vitamin C stands out from the rest for a specific skin benefits. Let’s now take a look at how each of these ascorbate compounds benefit the skin.

**Magnesium Ascorbyl Phosphate Restores Skin Hydration**

As the years pass, our skin loses its ability to retain moisture. This happens as the skin’s barrier function weakens under the assault of ultraviolet radiation and environmental stressors. The result is dry, flaking, and crepey skin. Research has shown that magnesium ascorbyl phosphate (MAP) enhances the skin’s ability to retain water, in turn making it visibly softer and smoother.

In a controlled clinical study, human volunteers applied topical magnesium ascorbyl phosphate to their forearm skin daily for four weeks. Researchers used two techniques called corneometry and cutometry to objectively measure skin hydration. By these measures, magnesium ascorbyl phosphate significantly increased hydration in both the outer and deeper layers of the skin, thereby demonstrating sustained effects. This finding was later confirmed in yet another trial.

**Ascorbyl Glucoside Fades Excess Pigmentation**

Hyperpigmentation reflects the abnormal output of the skin’s main pigment melanin. This creates an uneven skin tone that can add years to your appearance. To make matters worse, effective treatments are accompanied by undesirable side effects.

Human studies have shown that ascorbyl glucoside safely modulates common forms of hyperpigmentation such as age spots and difficult-to-treat melasma. This stems from its ability to block the action of tyrosinase, a key enzyme involved in the formation of new melanin.
What You Need to Know

In one clinical trial, patients aged 30 to 50 suffering from facial hyperpigmentation applied a topical formula comprising ascorbyl glucoside to one side of their faces daily for four weeks. At the end of the study, the treated side of the participants’ faces showed a significant reduction in total area of hyperpigmented spots. Additionally, 70% of subjects treated with ascorbyl glucoside reported lighter skin compared to 16.6% in the untreated group.25

In another study, scientists enlisted volunteers who applied a cream containing ascorbyl glucoside to their face twice daily for three months. The total area of age spots was assessed at baseline, and then 14, 28, 56, and 84 days after application. Researchers observed that within two weeks, total area of age spots decreased by an average of 14.2%, and after three months, this parameter further improved to 21.2%.26

Sodium Ascorbyl Phosphate Alleviates Acne

Although acne is associated with younger individuals, this inflammatory skin disorder affects 15.3% of women and 7.3% of men aged 50 and older.29 The development of acne is characterized by the excessive production and oxidation of sebum—the skin’s natural oil—that generates inflammation and is a breeding ground for bacteria called Propionibacterium acnes (P. acnes).30 This culminates in inflamed blemishes and lesions on the skin.

Sodium ascorbyl phosphate gained traction as a potential treatment for acne after it was found in laboratory investigations to strongly inhibit the growth of P. acnes and prevent sebum oxidation by up to 40%.31 The next step was to determine its efficacy in humans.

In a randomized, double-blind, controlled trial, 50 patients with mild to severe acne applied sodium ascorbyl phosphate or a placebo twice a day to their acne lesions for 12 weeks. Scientists found that treated patients saw greater improvements on several acne rating scales. Also, the treatment group's lesion count decreased by 21%—while the placebo group's diminished by 7%.32

Researchers then tested sodium ascorbyl phosphate versus benzoyl peroxide—a widely prescribed and effective acne treatment agent—on acne patients over a 12-week period. They discovered that twice-daily application of sodium ascorbyl phosphate resulted in good or excellent skin improvement in 76.9% of patients, compared to 60.9% in the benzoyl peroxide group. The research team concluded that sodium ascorbyl phosphate has “excellent efficacy in the treatment of acne vulgaris.”31

Stabilized Forms of Vitamin C Revive Aging Skin

- Vitamin C in its active form as L-ascorbic acid has multiple skin benefits, but its susceptibility to oxidation limits stability in topical preparations.
- More stabilized forms of vitamin C have been identified to provide beneficial effects on the skin.
- Magnesium ascorbyl phosphate, sodium ascorbyl phosphate, and ascorbyl glucoside work through several ways to prevent and repair sun-damaged skin, increase hydration, and combat common skin disorders like age spots and acne.
- When combined with ferulic acid into a topical formulation, the result is a visible improvement in the health and appearance of your skin.
Ferulic Acid Enhances Vitamin C Effects

The potent free radical scavenger ferulic acid often makes an appearance alongside vitamin C in topical preparations and for good reason. It has been shown to slow the breakdown of vitamin C and enhance its protective effects against ultraviolet damage. When added to a combination of vitamin C and E, ferulic acid doubled photoprotection, increasing it from 4-fold to 8-fold.\(^ {33} \)

Summary

Vitamin C in its primary form of L-ascorbic acid has a proven track record for improving aging skin. Scientists have now identified more stable forms of vitamin C including:

1. Magnesium ascorbyl phosphate
2. Sodium ascorbyl phosphate
3. Ascorbyl glucoside

These advanced forms of vitamin C have been combined with ferulic acid into a topical formulation that offers comprehensive protection against photoaging and combats common skin disorders to restore youthful skin.

Gary Goldfaden, MD, is a clinical dermatologist and lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology in Hollywood, FL, and Cosmesis Skin Care. Dr. Goldfaden is a member of Life Extension®’s Medical Advisory Board. All Cosmesis products are available online.

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

References

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

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

- **VERISOL® Bioactive Collagen Peptides®**—Stimulates the formation of new collagen and elastin to promote skin suppleness and elasticity\(^1\)

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

- **Biotin**—Supports nail strength and integrity\(^2\)

- **Silicon**—For the formation of collagen and keratin molecules\(^3\)

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

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Support Your Aging Immune System

Life Extension® researchers have developed an innovative formula with three natural compounds—Pu-erh Tea Extract, Cistanche, and Reishi Mushroom—that supports a more youthful immune system.

Pu-erh tea
• Supports decreases in inflammatory IL-6 while boosting natural killer cells and naïve T cells.1

Cistanche
• Supports longer life span in animals.2
• Optimizes the ratio of CD4 to CD8 cells, indicative of a more youthful immune system.2

Reishi
• Helps reduce biomarkers of immune senescence.3

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Research shows that replenishing the skin's age-related loss of vitamin C reduces the appearance of wrinkles, fine lines, and age spots.¹³

A new Triple Action Vitamin C Cream provides magnesium ascorbyl phosphate, sodium ascorbyl phosphate, and ascorbyl glucoside—enhanced with ferulic acid⁴—to:

- Promote collagen synthesis,¹
- Support natural defenses against photodamage,²
- Restore skin hydration,⁵
- Help inhibit discoloration of the skin,³ and
- Help alleviate skin blemishes⁶

More Youthful Skin Within Weeks!

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References
T cells attacking cancer cell.
Cancer kills more than 1,600 Americans every day. When an effective cancer drug is delayed by even a few months, the death toll can run into the tens of thousands.

When the delay is measured in decades, the number of needless cancer deaths escalates into the millions.

In 1996, a remarkable study was published in the prestigious journal *Science*. Two groups of mice with tumors were tested in the experiment. One group received a novel immunotherapy that resulted in eradication of tumors and immunity against a second tumor exposure.

The group of mice that did not receive the immunotherapy had to be euthanized because their tumors had grown out of control.

Instead of greeting this discovery as a potential treatment breakthrough, the medical establishment’s response was rather apathetic.

Nearly two decades later, immunotherapy drugs that work by this mechanism are garnering headlines around the world. You’re seeing these drugs advertised as being able to add longer life to advanced-stage cancer patients. Brand names include Yervoy®, Opdivo®, and Keytruda®.

Former President Jimmy Carter credits one of these drugs (Keytruda®) with helping induce a remission to his advanced-stage melanoma. (The media used the word “cure,” but this is not accurate.)

We at Life Extension® are appalled as to the length of time it took for cancer patients to access this class of immunotherapy. These drugs displayed remarkable results in animal models, yet it took too long for this class of drug to gain widespread recognition in the oncology mainstream.

These new immunotherapy drugs are not without serious side effects. Efficacy varies considerably based on the genetic makeup of the tumor. These drugs work by tearing down defenses tumors erect against immune cell eradication.

There is evidence indicating that judicious use of these drugs in earlier-stage cases combined with immune-augmenting drugs like low-dose interleukin-2 might increase the number of remissions, complete responses, and outright cures of metastatic malignancies.

This editorial describes cancer treatments that are not being optimally utilized, pointing to the urgent need for cancer patients to gain quicker access to new and potentially better therapies.
Sparking an Immune Alert against Cancer

The dilemma that exists with many malignancies is that the cancer itself can “trick” the body into pretending there is no cancer present. In other words, it’s not that the body doesn’t have the ability to defend itself; the problem is the body doesn’t know what it needs to defend against. If the immune system could identify the cancer early on, the resulting immune response might defeat the malignancy in many cases.2-8

Some T cells contain receptors that are actively searching for unhealthy cells to destroy. Cancer cells can evade T cell immune destruction by shielding themselves with high amounts of a ligand called “programmed death ligand 1,” or PD-L1.

Ligands are molecules that bind to other molecules. PD-L1 binds to receptors on our body’s T cells. When PD-L1 binds to immune T cell PD-1 receptors, it hacks and tricks the T cell into thinking there is no cancer present in the cell.

PD-L1 thus inhibits T cells from creating an immune attack necessary to destroy the cancer.

The new immunotherapy drugs (described previously) attach to the PD-1 receptors on T cells. These drugs are called checkpoint inhibitors because they block a tumor cell checkpoint by preventing tumor cell PD-L1 ligand from attaching to the PD-1 receptor on the body’s T cell membranes. These checkpoint inhibitor drugs neutralize the ability of certain tumor cells to shield themselves against T cell immune attack.4,6-8

Yervoy®, Opdivo®, and Keytruda® are the checkpoint inhibitors approved today. Despite published research dating back to 1996 showing the efficacy of these drug’s mechanisms,7 stifling bureaucracy delayed development and clinical testing. The result is that these lifesaving drugs have only painstakingly gained approval for certain cancers in years 2011-2015. (They are still not approved for the majority of cancers).9-12

Role of Gene Mutations in Cancer

One way cancer develops is as a result of the accumulation of mutations in genes that regulate cellular proliferation. Specific mutations in certain genes increase cancer risk.13

For instance, if there is a mutation in the BRCA gene, it increases one’s risk of breast cancer.14 A mutation in the BRAF gene can lead to uncontrolled growth of melanocytes causing a melanoma.15

Risk factors such as sunlight, ionizing radiation, heavily cooked food, and smoking cause gene mutations.16,17 A genetic mutation can also occur because of errors during DNA replication.18

The More Gene Mutations, the Better

A gene mutation is usually considered undesirable because it can cause or contribute to a wide range of diseases. Cancers with many gene mutations are often more difficult to treat because they have more survival options to escape eradication.19

When it comes to the new checkpoint inhibitor drugs such as Keytruda® and Opdivo®, however, researchers made an unusual discovery. It turns out that cancer cells with the most gene mutations respond far more favorably to treatment with this class of drug.20

For instance, Opdivo® (nivolumab) was given to a group of patients who had non-small cell lung cancer with high levels of mutations. The response rate was 73% compared to 13% for those who had low amounts of mutations.20,21
One way the immune system detects cancer cells is because of their mutations, which make the tumor cells appear as a foreign body. Tumor cells with more mutations are more effectively treated with checkpoint inhibitor drugs since these tumor cells create more antigens that attract T cells. If the cancer did not have many genetic mutations, then treatment using these new drugs is less effective.

**Improved Survival Using Opdivo®**

Melanomas make up the majority of skin cancer deaths even though they only account for 1% of skin cancers. If melanoma is detected early and has not spread, then survival rates are relatively high. Stage IV (metastatic) melanoma has a very low survival rate.¹

Recent studies have shown the checkpoint inhibitor Opdivo® offers a more favorable prognosis than the conventional treatments that have been used for decades.²⁻²⁶

*The New England Journal of Medicine* released a study in 2015 comparing Opdivo® to the chemotherapy drug dacarbazine in 418 metastatic melanoma patients. The survival rate after one year was 72.9% for those who received Opdivo® compared to only 42.1% for those who received dacarbazine.²²

In addition, there were (slightly) fewer treatment-related adverse effects for those who received Opdivo®. Of those who received Opdivo®, 6.8% had to discontinue treatment compared to 11.7% for those who used dacarbazine.²²

Shortly after this study was released, Opdivo® was tested in two different studies. The first was on advanced squamous-cell non-small-cell lung cancer involving 272 patients previously treated and whose disease had progressed; the second involved 582 patients with advanced non-squamous non-small-cell lung cancer. Researchers compared Opdivo® to the chemotherapy drug docetaxel in both studies.²³,²⁴

After 12 months, the survival rate for the squamous-cell non-small-cell lung cancer study was 42% in the patients who received Opdivo® compared to 24% for the patients given docetaxel.²³

At 18 months, the survival rate for the non-squamous non-small-cell lung cancer study was 39% in the patients who received Opdivo® compared to 23% for the patients given docetaxel.²⁴

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**What You Need to Know**

**Misplaced Priorities**

- Immunotherapy drugs—or checkpoint inhibitors—have proved effective at treating late-stage cancers. Yet their immune-modulating mechanism was published 20 years ago.

- These drugs, Yervoy®, Opdivo®, and Keytruda®, are more effective on cancer cells with the most gene mutations. In one study, the response rate on patients with non-small cell lung cancer with high levels of gene mutations was 73%.

- Interleukin-2 enhances natural killer cell activity. Pretreatment with interleukin-2 by itself dramatically improved clinical outcomes in pancreatic cancer patients.

- Bureaucratic delays and regulations delay dying patients access to innovative treatments.

- World-renowned physician Dr. Vincent DeVita is calling for a new and improved National Cancer Act that will take clinical cancer trials away from the FDA and place them with National Cancer Institute cancer centers as a way to eliminate delays and end inane regulations.
Results with Yervoy® and Keytruda®

Keytruda® (pembrolizumab) is showing results indicating it may be more effective than Yervoy® (ipilimumab) for metastatic melanoma patients. A detailed study compared the two drugs, as well as their dosing, on an average of 278 patients in each group. Those who received Keytruda® had a one-year survival rate of 74.1% compared to 58.2% for Yervoy®. It is important to note that 34% of all these patients had previously received other systemic therapies.27

The response rate refers to the percentage of patients whose cancer disappeared or shrunk after treatment.28 The group that received Keytruda® had a response rate of 33.7% compared to only 11.9% for Yervoy®. The best results were seen when Keytruda® was used every two weeks at a dose of 10 mg per kilogram of body weight. The Keytruda® treatment was also associated with less severe side effects.

Strengthening the Immune System

Interleukin-2 (IL-2) enhances overall immune function, most notably by enhancing natural killer cell activity.29-31

Interleukin-2 can be highly effective when delivered before immune-suppressing conventional therapies. A number of studies reveal that pretreatment with interleukin-2 before a standard cancer treatment protocol can improve clinical outcomes.32-35

Pancreatic cancer has the lowest survival rate of most any form of cancer.1 Only 15% to 20% of pancreatic cancer patients are eligible for a complex surgery that involves the removal of the head of the pancreas and other digestive organs.36 This horrific surgery, known as the Whipple procedure, has a mortality rate of 15% and a five-year survival rate of only 10%.37

A study released in the journal Hepato-Gastroenterology revealed that when moderate-dose interleukin-2 was administered before the Whipple procedure, the survival rate after three years was 22% compared to 0% in the group that did not receive interleukin-2.38

In 2015, the Journal of the American Academy of Dermatology reported on another study that used interleukin-2 and other immune boosters. Eleven patients with cutaneous (skin) metastatic melanoma were given injections of interleukin-2 directly into skin lesions along with applications of the drug imiquimod and a topical vitamin A drug (tazarotene).39

All 11 patients had a 100% complete response rate from this three-drug combination (interleukin-2, imiquimod, vitamin A). Biopsies confirmed that there was an absence of malignant cells in the treated areas. Two-year survival rate was 82% in these patients receiving the three-drug combo.39

The results of this study were so impressive that the study was included in the US National Comprehensive Cancer Network guidelines.39

Synergistic Combination of Interleukin-2 and Checkpoint Inhibitors

Checkpoint inhibitors and interleukin-2 have unique mechanisms of action on the immune system. The checkpoint inhibitors break down shields that cancer cells erect against immune attack while interleukin-2 promotes natural killer cell immune activity.
It is therefore logical to speculate that the combination of interleukin-2 and a checkpoint inhibitor drug would be more effective than either drug alone.

A recent study supports this hypothesis. In this study, mice were first injected with immune-resistant melanoma cells to infiltrate the mouse’s body similar to metastatic melanoma in humans.

Researchers then tested interleukin-2 alone, cytotoxic T lymphocyte antigen 4 (CTLA-4) blockade (checkpoint inhibitor like Yervoy®) alone, or a combination of interleukin-2 and CTLA-4 blockade on these mice. The results were prolonged survival and significantly delayed tumor growth in the mouse group getting both drugs (interleukin-2 and checkpoint inhibitor).5

In the control group, tumors reached a size of 76 mm². In the mice that received interleukin-2 alone, tumor growth was 29 mm².

By contrast, the checkpoint inhibitor group’s tumors grew by 14 mm², which was only half the size as the mice treated with interleukin-2 alone.5

What is astonishing is the mice that received interleukin-2 and the checkpoint inhibitor combination had a tumor growth of only 2 mm². This combination was seven to 14 times more effective than treatment with either drug alone.5

At day 23, there was 100% survival in the group receiving the interleukin-2 and checkpoint inhibitor combination compared to 30% survival in the interleukin-2-only group and 50% survival in the checkpoint inhibitor-only group. Control-treated mice were all dead by day 23.5

This study, along with a cumulative knowledge of the mechanisms of action of interleukin-2 and checkpoint inhibitors, indicates that the combination of these two immunotherapies might be suitable to study in human metastatic patients.

Fighting Brain Tumors

Researchers at Duke University are conducting trials on an innovative therapy that uses a genetically engineered poliovirus to fight glioblastoma.40,41

Scientists have removed a specific genetic sequence from the poliovirus and replaced it with an innocuous part from the rhinovirus. This completely changes the structure of the poliovirus into an oncolytic virus, which is a virus that attacks cancer cells.42,43

This genetically engineered poliovirus naturally targets cancer cells since the receptor for poliovirus is abnormally present in most tumor cells. This oncolytic or “cancer-fighting” virus only kills cancer cells because their ability to grow depends on the biochemical abnormalities that are only present in cancer cells.41

A report on 60 Minutes about the use of this poliovirus treatment on glioblastoma brain tumor patients was nothing short of astounding. The genetically
engineered poliovirus extended the lives of most of the patients. Some glioblastoma patients appeared to go into a complete remission, with no evidence of residual remaining tumor.\textsuperscript{44}

The researchers are conducting further studies and are enrolling all glioblastoma patients who meet eligibility criteria. In less than a year, the FDA is expected to make a decision on approving this immunotherapy for glioblastoma patients.\textsuperscript{44}

**Immunotherapy Prevents Breast Cancer Metastasis**

A therapy called \textbf{photodynamic immunotherapy} (PDIT) was described in the November 2012 and September 2015 editions of Life Extension® magazine.

This immunotherapy works by first delivering a photosensitizing agent to the breast tumor. This enables the effects of a laser to be amplified in a way that destroys the primary tumor. The agent used also enables the immune system to mount a response against infiltrative or metastatic tumor cells. In addition, it breaks down cancer’s defense mechanisms that would otherwise thwart immune attack.\textsuperscript{45,46}

When this therapy was studied on 15 breast cancer patients, survival rates were comparable or exceeded that of conventional treatments, which utilize mastectomy, radiation, and chemotherapies. What makes photodynamic immunotherapy newsworthy is that it is has no serious side effects.\textsuperscript{47}

Current studies are testing photodynamic immunotherapy for prostate, lung, melanoma, and other advanced cancers. If you would like more information on the availability of photodynamic immunotherapy, please call the International Strategic Cancer Alliance (ISCA) at 1-610-628-3419.

**How Regulations Create Delays**

In 1971, the United States government enacted the \textbf{National Cancer Act}.\textsuperscript{48} It is almost half a century later and more than 1,600 Americans die of cancer every day.\textsuperscript{1}

Dr. Vincent DeVita is a world-renowned physician. He has served as the director at the National Cancer Institute, physician-in-chief at Memorial Sloan Kettering Cancer Center, director of Yale University’s Cancer Center, and president of the American Cancer Society.\textsuperscript{49}

Dr. DeVita writes, “\textit{The real impediment in the war is the regulatory environment and an outdated infrastructure for it, created well before we knew much about the disease}.\textsuperscript{49}”

The \textbf{National Cancer Act} was a step closer to the cure for cancer, but it wasn’t good enough.

The act attempted to shift the power of drug approval from the FDA to the National Cancer Institute, but instead the FDA became a roadblock for patients awaiting new drugs.

The National Cancer Act of 1971 also established cancer centers in universities, but they too often became entangled with academic politics and grants.

According to Dr. DeVita, cancer centers founded by the National Cancer Institute have...
Institute (NCI) should be allowed to practice independently. The authority to prioritize clinical trials needs to be taken away from the FDA and given to these NCI cancer centers.49

Dr. DeVita calls for a new National Cancer Act. He asserts that we have amassed the scientific knowledge, but bureaucratic regulations need to be circumvented to more effectively develop curative therapies.

We at Life Extension® have long concurred with what Dr. DeVita is now publically calling for, i.e. an end to inane regulations that hinder development of novel cancer treatments.

Summary

The delay of effective drugs translates to millions of needless deaths.

The efficacy of immunotherapy drugs (Yervoy®, Opdivo®, and Keytruda®) that target the genetic makeup of a tumor dates back to 1996, yet even today, they’ve only gained approval for use in a small number of cancers.

These drugs are known as checkpoint inhibitors, and when they are combined with interleukin-2, survival rates increase even more dramatically in the mouse model.

A Duke University study of genetically engineered poliovirus has shown outstanding results on glioblastoma patients.

These advances have managed to occur (slowly) despite bureaucratic roadblocks that innovative researchers must contend with. ●

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

References


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Most people recognize insulin as a beneficial hormone. It helps remove sugar (glucose) from the blood into cells where it is used to power energy or is stored as surplus fat.

For years, Life Extension® has discussed the role of excess insulin as a culprit involved in metabolic syndrome, which increases degenerative disease risk. In particular, high levels of insulin are now recognized as important contributors to the development and progression of many kinds of cancer.1-3

How has such a vital, natural hormone been converted from life-supporting friend to deadly foe?

The answer lies with the nation’s love affair with calories, particularly those derived from simple sugars and refined carbohydrates. Americans eat so many of these dangerous foods that 50% are overweight, 30% are obese, and 10% already have type II diabetes.2

Studies in the past decade have revealed a close connection between body size, type II diabetes, and many cancers.2,3 For example, consuming a diet rich in readily digested sugars and carbohydrates increases the risk of developing the most common form of breast cancer by 36% to 41%.4

A consistent finding across a broad spectrum of common malignancies reveals that higher blood insulin, often caused by chronically elevated blood glucose, results in increased cancer risk.
For example, prostate cancer incidence is 2.55-fold greater in men with the highest blood insulin levels.5

The Emerging Connection between Obesity, Insulin, and Cancer

As people gain weight, their fat cells begin to pour out cytokines that generate inflammation throughout the body.3,6 This leads to the phenomenon called “insulin resistance,” in which cells lose their ability to move glucose from the blood and into cells under the influence of normal blood levels of insulin.3 As a result, sugar levels rise, triggering further increases in insulin release from the pancreas. Insulin-resistant cells cannot respond, leading to still higher glucose and higher insulin levels in a vicious cycle.3

Eventually, a state of type II diabetes develops, but elevated insulin levels are found in a very large number of people not yet diagnosed with the disease.7,8 And that’s dangerous.

Because insulin is a growth factor, high insulin levels in cells trigger more rapid cell division, while elevated sugar and fat levels provide more metabolic fuel.3,4 Along the way, some cells lose control of their DNA regulatory genes, which is the hallmark of malignancy. This sequence of events is now thought to contribute to the promotion of cancer, at least in colon cells and probably in those throughout the body.3

Research Documents Insulin’s Role in Cancer Models

Diabetes and resulting elevated insulin levels are associated with increased risk of many kinds of cancer, as well as with development of more aggressive and metastatic cancers that carry a grim prognosis.9,10 Mechanisms for this deadly trend have emerged from laboratories around the world in just the past few years.

One of the most fundamental pathologies recently elucidated is damage to DNA, often the first step in cancer development. Even very tiny amounts of insulin, applied a single time to cell cultures, generated sufficient toxic oxidative stress to damage DNA strands.10,11 Prolonging exposure for six days reduced the concentration of insulin required to induce such damage by a factor of 10, demonstrating the extreme risks of chronically elevated insulin in the body.11

As a growth factor, insulin naturally stimulates cell growth. But too much insulin results in overstimulation once a cancer cell has emerged, promoting proliferation, migration, and invasiveness of cancer cells by means of multiple fundamental biochemical signaling pathways.9,12

A vivid demonstration of the cancer-promoting effects of insulin comes from a study of mice that had been injected with colon cancer cells and then fed either a normal or a high-calorie diet. Tumors in the high-calorie group grew to twice the size of those in the normal group in just 17 days.13 The high-calorie-diet animals had high levels of insulin and other growth-promoting molecules, demonstrating a close connection between insulin and cancer growth rate.

Human Studies Show Dangers of Elevated Insulin

Coming atop the most recent laboratory studies are a number of human studies that emphasize the essential role of insulin in promoting cancers, making this an area of fertile interest among oncologists and prevention experts.
Insulin levels have been implicated in at least seven of the most common human malignancies.

Colorectal cancer remains the second cause of cancer death in the US among men and women combined. Elevated insulin levels are a risk factor for these lower bowel tumors. Ethnic groups with low insulin sensitivity, even absent obesity, are known to have higher rates of colorectal cancers.

A study involving patients who underwent both routine colonoscopy exams and fasting insulin measurements found that insulin levels raise the risk of having pre-cancerous growths called adenomas by 17% to 42%, with higher risk associated with higher levels.

Gastric (stomach) cancer risk is 69% higher for people with blood insulin levels in the middle third, compared with those in the bottom third of results, and 101% higher in those with the top one-third of insulin levels.

Cancers of the female reproductive system seem especially sensitive to elevated insulin levels. For example, women with higher insulin levels are at a 2- to 3-fold increased risk for breast cancer, compared to those with lower levels. Similarly, risk for endometrial (uterine lining) cancer rises dramatically with elevated insulin. Risk increases with higher insulin levels almost 10-fold for early premalignant changes in endometrial cells, 8.5-fold for later premalignant changes, 18-fold for true precancerous lesions, and a shocking 45-fold for type I endometrial cancer.

Elevated serum insulin levels are also associated with increased risk for ovarian cancer.

Prostate cancer risk is also closely associated with insulin levels. Men with the highest blood insulin levels in one study showed a 2.55-fold increased risk of malignancy compared with those having the lowest levels. And men with the highest level of insulin had a 5.62-fold increase in the risk of having locally advanced tumors than those with lower levels, while the most insulin-resistant subjects’ risk of advanced cancer was more than 3-fold increased.

Liver cancer has multiple triggers, including infection with hepatitis viruses. Among people infected with hepatitis B virus, those with the highest insulin levels have an approximate 2.4-fold increase in the risk of developing liver cancer.

Several nutrients have emerged showing promise in reducing insulin levels and/or increasing insulin sensitivity, which lowers glucose and insulin blood levels.

The most prominent of these are resveratrol, fish oil rich in the omega-3 fats eicosapentaenoic and docosahexaenoic acids (EPA and DHA), green tea extracts, and ginseng extract.

Metformin, a prescription anti-diabetic drug, is also strongly associated with reduced cancer risk, and lowers insulin levels as a direct part of its actions.

### Summary

Consuming a Western diet high in sugars and carbohydrates produces up to a 41% increase in the risk of developing the most common kind of breast cancer. Stomach, prostate, liver, and reproductive cancers are also at an increased risk. Natural supplements may help reduce blood insulin levels, especially fish oil, green tea extracts, and resveratrol. Metformin, of course, is also strongly associated with lowering insulin levels, thereby reducing these cancer risks.

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**Huge Reductions in Insulin Levels with Popular Dietary Supplements**

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18. Phloridzin56-58 Normalizes glucose tolerance and insulin sensitivity

**Additional Ways to Help Control Insulin Levels**

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<tr>
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<td>Enhances insulin sensitivity; lowers insulin levels</td>
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<tr>
<td>Coffee48-51</td>
<td>Improves insulin resistance; IGF-1 levels</td>
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<tr>
<td>Phaseolus vulgaris (white kidney bean) and other legume extracts52-55</td>
<td>Lowers insulin levels</td>
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<tr>
<td>Sorghum59-61</td>
<td>Improves insulin sensitivity; lowers insulin levels</td>
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References


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( LC100045) Tests for genetic mutations in MTHFR and COMT.

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**MEN’S ANNUAL BLOOD TESTING**

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<td>Vitamin D (25-hydroxyvitamin D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| MALE HORMONE ADD-ON PANEL* (LCADDOM)       | $180         | $90              |
| Pregnenolone and Dihydrotestosterone (DHT) |              |                  |

**THYROID ADD-ON PANEL (LCTHYROID)  Free T3 & Free T4.**

<table>
<thead>
<tr>
<th>TEST</th>
<th>RETAIL PRICE</th>
<th>SUPER SALE PRICE</th>
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</thead>
<tbody>
<tr>
<td>INSULIN (LC004333)</td>
<td>$39.87</td>
<td>$24.42</td>
</tr>
<tr>
<td>Helps to assess insulin resistance.</td>
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<td></td>
</tr>
<tr>
<td>NMR LIPOPROFILE (LC123810)</td>
<td>$132</td>
<td>$74.25</td>
</tr>
<tr>
<td>The NMR Lipoprotein™ directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one’s risk of insulin resistance by assessing abnormalities in lipoprotein markers.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ADVANCED OXIDIZED LDL PANEL (LC100035)**
This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic and cardiovascular disease as well as the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase and Oxidized LDL.

<table>
<thead>
<tr>
<th>TEST</th>
<th>RETAIL PRICE</th>
<th>SUPER SALE PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOOD SAFE ALLERGY TEST** (LCM37001)</td>
<td>$264</td>
<td>$148.50</td>
</tr>
<tr>
<td>This test measures delayed (IgG) food allergies for 95 common foods.</td>
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</tbody>
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**WOMEN’S ANNUAL BLOOD TESTING**

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<th>TEST</th>
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<th>SUPER SALE PRICE</th>
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<tr>
<td>FEMALE LIFE EXTENSION PANEL (LC322533)</td>
<td>$400</td>
<td>$199</td>
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<td>CBC/Chemistry Profile (description on next page)</td>
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<td>DHEA-S</td>
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<td>Estradiol</td>
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<td>C-Reactive Protein (high-sensitivity)</td>
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<tr>
<td>Progesterone</td>
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<tr>
<td>Free Testosterone</td>
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<tr>
<td>Total Testosterone</td>
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<tr>
<td>TSH for thyroid function</td>
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<tr>
<td>Vitamin D (25-hydroxyvitamin D)</td>
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<td></td>
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<tr>
<td>Hemoglobin A1c</td>
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<td></td>
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</tbody>
</table>

| FEMALE HORMONE ADD-ON PANEL* (LCADDFF)     | $166.75      | $93.75           |
| Pregnenolone and Total Estrogen            |              |                  |

**THYROID ADD-ON PANEL (LCTHYROID)  Free T3 & Free T4.**

<table>
<thead>
<tr>
<th>TEST</th>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**ADVANCED OXIDIZED LDL PANEL (LC100035)**
This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic and cardiovascular disease as well as the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase and Oxidized LDL.

<table>
<thead>
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<td></td>
</tr>
</tbody>
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**SUPER SALE**

<table>
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<tr>
<th>TEST</th>
<th>RETAIL PRICE</th>
<th>SUPER SALE PRICE</th>
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</thead>
<tbody>
<tr>
<td>ADVANCED OXIDIZED LDL PANEL (LC100035)</td>
<td>$380</td>
<td>$213.75</td>
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</table>

* This test requires samples to be shipped to the lab on dry ice for customers using a Blood Draw Kit and will incur an additional $35 charge. If the customer is having blood drawn at a LabCorp facility, this extra charge does not apply.
** This test is packaged as a kit.
OTHER POPULAR PANELS

- CBC/Chemistry Profile (LC381822) $47 $26
  Note: This CBC/Chemistry Profile is included in many Life Extension Panels. Please note panel descriptions.

CARDIOVASCULAR RISK PROFILE
- Total Cholesterol
- HDL Cholesterol
- LDL Cholesterol
- Triglycerides

LIVER FUNCTION PANEL
- AST (SGOT)
- ALT (SGPT)
- Total Bilirubin
- Alkaline phosphatase
- LDH

KIDNEY FUNCTION PANEL
- BUN
- Creatinine

BLOOD PROTEIN LEVELS
- Total Protein
- Albumin
- Globulin
- Albumin/Globulin Ratio

BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE
- Red Blood Cell Count
- White Blood Cell Count
- Eosinophils
- Basophils
- Neutrophils (Absolute)
- Lymphs (Absolute)
- Monocytes (Absolute)
- Eos (Absolute)
- Baso (Absolute)
- MCHC
- MCV
- MCH
- RDW

BLOOD MINERAL PANEL
- Calcium
- Potassium
- Phosphorus
- Sodium
- Iron

MALE ELITE PANEL (LC100016)* $766.66 $431.25

FEMALE ELITE PANEL (LC100017)* $766.66 $431.25

WEIGHT LOSS PANEL-BASIC (LC100027) $173.33 $97.50
- CBC/Chemistry profile (see description above), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Insulin and Hemoglobin A1c.

WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028) $366.66 $206.25
- CBC/Chemistry profile (see description above), DHEA-S, free and total Testosterone, Estradiol, Progesterone, Cortisol, TSH, Free T3, Free T4, Reverse T3, Insulin, Hemoglobin A1c, Vitamin D 25-hydroxy, C-reactive protein (high sensitivity), and Ferritin.

HEALTHY AGING PANEL-BASIC (LC100025) $198.66 $111.75
- CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Hemocysteine, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Ferritin, and Insulin.

HEALTHY AGING PANEL-COMPREHENSIVE (LC100026) $332 $186.75
- CBC/Chemistry profile (see description above), C-reactive protein (high sensitivity), Vitamin B12, Folate, Hemocysteine, Vitamin D 25-hydroxy, Hemoglobin A1c, TSH, Free T3, Free T4, Ferritin, Urinalysis, Fibrinogen, and Insulin.

FEMALE COMPREHENSIVE HORMONE PANEL* $398.66 $224.25
- CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, SHBG, TSH, Free T3. This panel now includes Free T4 and Cortisol with no increase in price!

MALE COMPREHENSIVE HORMONE PANEL* $398.66 $224.25
- CBC/Chemistry Profile (see description at left), DHEA-S, Estradiol, Total and Free Testosterone, PSA.

FEMALE BASIC HORMONE PANEL (LC100013) $100 $56.25
- DHEA-S, Estradiol, Total and Free Testosterone, Progesterone.

ANEMIA PANEL* (LC100006) $105.33 $59.25
- CBC/Chemistry Profile (see description), Ferritin, Total Iron Binding Capacity (TIBC), Vitamin B12, Folate.

DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040) $265.33 $149.25

DIABETES MANAGEMENT PROFILE – BASIC (LC100039) $52 $29.25

AUTOIMMUNE DISEASE SCREEN (L100041C) $265.33 $149.25
- ANA screen, hs-CRP, TNF, Immunoglobulins, IgA, IgG and IgM.

COMPREHENSIVE THYROID PANEL (LC100181) $265.33 $149.25
- TSH, T4, Free T4, Free T3, Reverse T3, TPO, ATA

LIFE EXTENSION THYROID PANEL (LC304131) $100 $56.25
- TSH, Free T4, Free T3, T4.

THYROID PANEL WITH REVERSE T3 (LC100044) $160 $90
- TSH, T4, Free T3, Free T4, Reverse T3

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

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

TERMS AND CONDITIONS

This blood test service is for informational purposes only and no specific medical advice will be provided. National Diagnostics, Inc., and the Life Extension Foundation contract with a physician who will order your test(s), but will not diagnose or treat you. Both the physician and the testing laboratory are independent contractors and neither National Diagnostics, Inc., nor the Life Extension Foundation will be liable for their acts or omissions. Always seek the advice of a trained health professional for medical advice, diagnosis, or treatment. When you purchase a blood test from Life Extension/National Diagnostics, Inc., you are doing so with the understanding that you are privately paying for these tests. There will be absolutely no billing to Medicare, Medicaid, or private insurance. I have read the above Terms and Conditions and understand and agree to them.

Signature of Life Extension Customer

X

Date of Birth (required) / / 
Address 
City State Zip
Phone
Credit Card No.
Expiration Date / 

Mail your order form to:

Life Extension
NATIONAL DIAGNOSTICS, INC.
3600 West Commercial Boulevard
Fort Lauderdale, FL 33309
Phone your order to: 1-800-208-3444
Fax your order to: 1-866-728-1050
**Amino Acids**
- Arginine/L-Ornithine Capsules
- Arginine Ornithine Powder
- Branched Chain Amino Acids
- D,L-Phenylalanine Capsules
- L-Arginine Caps
- L-Carnitine
- L-Glutamine
- L-Glutamine Powder
- L-Lysine
- L-Taurine Powder
- L-Tyrosine Powder
- Super Carnosine
- Taurine

**Blood Pressure & Vascular Support**
- Advanced Olive Leaf Vascular Support with Celere Seed Extract
- Arterial Protect
- Blood Pressure Monitor Arm Cuff
- Endothelial Defense™ with Pomegranate Complete and CORDIART™
- Endothelial Defense™ with GluSODin®
- Natural BP Management
- NitroVasc with CORDIART™
- Pomegranate Complete
- Pomegranate Fruit Extract

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

**Brain Health**
- Acetyl-L-Carnitine
- Acetyl-L-Carnitine Arginate
- Blast
- Brain Shield® Gastrodin
- Cognitex® Basics
- Cognitex® with Brain Shield®
- Cognitex® with Pregnenolone & Brain Shield®
- Cognizin® CDP-Choline Caps
- DMAE Bitartrate (dimethylethanolamine)
- Dopa Mini™
- Ginkgo Biloba Certified Extract™
- Huperzine A
- Lecithin Granules
- Migra-Eze™
- Neuro-Mag® Magnesium L-Threonate
- Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
- Optimized Ashwagandha Extract Prevagen™
- PS (Phosphatidylserine) Caps
- Vinpocetine

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

**Digestion Support**
- Artichoke Leaf Extract
- Carnosoothe with PicroProtect™
- Digest RC®
- Effervescent Vitamin C - Magnesium Crystals
- Enhanced Super Digestive Enzymes
- Enhanced Super Digestive Enzymes w/Probiotics
- Esophageal Guardian
- Extraordinary Enzymes
- Fem Dophilus

**Energy Management**
- Adrenal Energy Formula
- Asian Energy Boost
- D-Ribose Powder
- D-Ribose Tablets
- Forskolin
- Mitochondrial Basics with BioPQQ®
- Mitochondrial Energy Optimizer with BioPQQ®
- NAD+ Cell Regenerator™
- Peak ATP® with GlycoCam®
- PQQ Caps with BioPQQ®
- Rhodiola Extract
- RibGor™ French Oak Wood Extract
- Triple Action Thyroid

**Eye Health**
- Astaxanthin with Phospholipids
- Brite Eyes III
- Certified European Bilberry Extract
- Eye Pressure Support with Mirtogenol®
- MacuGuard® Ocular Support
- MacuGuard® Ocular Support with Astaxanthin
- Tear Support with Macuglide®

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

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

**Glucose Management**
- CinSulin® with InSea® and Crominex® 3+
- Mega Betaine
- Natural Glucose Absorption Control
- TN Sugar Shield®

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

**Hormone Balance**
- DHEA (Dehydroepiandrosterone)
- Inner Power
- Pregnenolone
- Triple Action Cruciferous Vegetable Extract with Resveratrol
- Triple Action Cruciferous Vegetable Extract

**Immune Support**
- AHCC®
- Echinacea Extract
- Enhanced Zinc Lozenges
- 26 Hyperimmune Egg
- Immune Modulator with Tinofend®
- Immune Protect with PARACTIN®
- Immune Senescence Protection Formula™
- Kinoko® Gold AHCC
- Kyolic® Garlic Formula 102
- Kyolic® Garlic Formula 105
- Kyolic® Reserve
- Lactoferrin (apolactoferrin) Caps
- NK Cell Activator™
- Optimized Garlic
- Optimized Quercetin
- Peony Immune
- ProBoost Thymic Protein A
- Reishi Extract Mushroom Complex
- Standardized Citrachene
- Ten Mushroom Formula™
- Zinc Lozenges

**Inflammation Management**
- 5-LOX Inhibitor with AprèsFlex®
- Advanced Bio-Curcumin® with Ginger & Turmericones
- Black Cumin Seed Oil with Bio-Curcumin®
- Black Cumin Seed Oil
- Boswellia
- Cytokine Suppress™ with EGCG
- Nervia®
- Serraflyzyme
- Specially-Coated Bromelain
- Super Bio-Curcumin®
- Zylamend® Whole Body

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

**Kidney & Bladder Support**
- Cran-Max® Cranberry Whole Fruit Concentrate
- Optimized Cran-Max® with Ellirosé®
- Uric Acid Control
- Water-Soluble Pumpkin Seed Extract

**Liver Health & Detoxification**
- Anti-Alcohol Antioxidants with HepatoProtection Complex
- Calcium D-Glucarate
- Chlorella
- Chlorophyll
- European Milk Thistle
- Glutathione, Cysteine & C
- HepatoPro
- Liver Efficiency Formula
- N-Acetyl-L-Cystein
- PectaSol-C®
- Silymarin
- SODzyme® with GluSODin® & Wolfberry

**Longevity & Wellness**
- AMPK Activator
- AppleWise Polyphenol Extract
- Berry Complete
- Blueberry Extract
- Blueberry Extract with Pomegranate
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<thead>
<tr>
<th>Item No.</th>
<th>Product</th>
<th>Retail Each $</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
<th>10 Unit Each</th>
<th>QTY Total</th>
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<td>Aspirin • 81 mg, 300 enteric coated tablets</td>
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<td>01923</td>
<td>Astaxanthin with Phospholipids • 4 mg, 30 softgels</td>
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**Subtotal of Column 1**

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Product</th>
<th>Retail Each $</th>
<th>1 Unit Each</th>
<th>4 Unit Each</th>
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<th>QTY Total</th>
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<td>00920</td>
<td>Benfotiamine W/Thiamine • 100 mg, 120 veg. caps</td>
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<td>Bifido GI Balance • 60 veg. caps</td>
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<td>Bio-collagen W/Patented UC-II® • 40 mg, 60 small caps</td>
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<td>Biotin • 600 mcg, 100 caps</td>
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<td>Black Cumin Seed Oil W/Bio-Curcumin® • 60 softgels</td>
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<td>01008</td>
<td>Blast™ • 600 grams of powder</td>
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<td>70000</td>
<td>Blood Pressure Monitor (AccuFit®) • med/lg cuff</td>
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<td>Blood Pressure Monitor • Digital wrist cuff</td>
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**Subtotal of Column 2**

To order online visit: www.LifeExtension.com

Receive 25% off the retail price of all products.
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<td>01659</td>
<td>COGNIZIN® CDP CHOLINE CAPS • 250 mg, 60 veg. caps</td>
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<td>01495</td>
<td>COMPLETE B-COMPLEX (BioActive) • 60 veg. caps</td>
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<td>02098</td>
<td>COMPREHENSIVE NUTRIENT PACKS ADVANCED • 30 packs</td>
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<td>COQ10 w/ LIMONENE (Super-Absorbable) • 50 mg, 60 softgels</td>
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<td>00950</td>
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<td>COQ10 (Super ubiquinol) • 100 mg, 60 softgels</td>
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<td>COQ10 w/BIOPQQ® (Super ubiquinol) • 100 mg, 30 softgels</td>
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<td>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super ubiquinol) • 100 mg, 60 softgels</td>
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<td>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super ubiquinol) • 50 mg, 30 softgels</td>
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<td>COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super ubiquinol) • 200 mg, 300 softgels</td>
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<td>00862</td>
<td>CRAN-MAX® • 500 mg, 60 veg. caps</td>
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<td>01424</td>
<td>CRAN-MAX® WITH ELLILOSE™ (Optimized) • 60 veg. caps</td>
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<td>CREATINE CAPSULES • 120 veg. caps</td>
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<td>01746</td>
<td>CREATINE WHEY GLUTAMINE POWDER • 454 grams (vanilla)</td>
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<td>CR MICROMETIC LONGEVITY FORMULA • 60 veg. caps</td>
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<td>00407</td>
<td>CURCUMIN® (Super Bio) • 400 mg, 60 veg. caps</td>
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<td>CURCUMIN® W/GINGER &amp; TURMERONES (Advanced bio) 30 softgels</td>
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<td>01804</td>
<td>CYTOKINE SUPPRESS™ W/ESCC • 30 veg. caps</td>
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**COSMETICS**

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<tr>
<td>80157</td>
<td>ADVANCED ANTI-GLYCATION PEPTIDE SERUM • 1 oz</td>
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<td>80154</td>
<td>ADVANCED LIGHTENING CREAM</td>
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<td>80155</td>
<td>ADVANCED PEPTIDE HAND THERAPY • 4 oz</td>
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<td>80152</td>
<td>ADVANCED TRIPLE PEPTIDE SERUM • 1 oz</td>
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<td>80140</td>
<td>ADVANCED UNDER EYE SERUM W/STEM CELLS • .33 oz</td>
<td>49.00</td>
<td>36.75</td>
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<td>80139</td>
<td>AMBER SELF MICRODERMABRASION • 2 oz</td>
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<tr>
<td>80158</td>
<td>ANTI-AGING FACE OIL • 1 oz</td>
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<tr>
<td>80118</td>
<td>Anti-aging Mask • 2 oz</td>
<td>72.00</td>
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<tr>
<td>80151</td>
<td>ANTI-AGING REJUVENATING FACE CREAM • 2 oz</td>
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<td>80153</td>
<td>ANTI-AGING REJUVENATING SCALP SERUM • 2 oz</td>
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<td>80134</td>
<td>ANTI-GLYCATION SERUM W/BLUEBERRY &amp; POMEGRANATE EXTRACTS • 1 oz</td>
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<td>80133</td>
<td>ANTIOXIDANT FACIAL MIST • 2 oz</td>
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<td>80127</td>
<td>ANTI-AGEING REJUVENATING FOOT CREAM • 2 oz</td>
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<td>ANTI-AGEING REJUVENATING FOOT SCRUB • 2 oz</td>
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<td>80117</td>
<td>ANTI-AGEING REJUVENATING HAND CREAM • 2 oz</td>
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<td>80105</td>
<td>ANTI-REDNESS &amp; ADULT BLEMISH LOTION • 1 oz</td>
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<td>80147</td>
<td>BIOLIPSANOID CREAM • 1 oz</td>
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<td>80144</td>
<td>BROCCOLI SPROUT CREAM • 1 oz</td>
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<td>80156</td>
<td>COLLAGEN BOOSTING PEPTIDE SERUM • 1 oz</td>
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<td>CORRECTIVE CLEARING MASK • 2 oz</td>
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<td>80141</td>
<td>DNA REPAIR CREAM • 1 oz</td>
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**SUBTOTAL OF COLUMN 3**

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<td>7-KETO® DHEA METABOLITE • 25 mg, 100 caps</td>
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<td>01479</td>
<td>7-KETO® DHEA METABOLITE • 100 mg, 60 veg. caps</td>
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<td>01640</td>
<td>DHA (Vegetarian sourced) • 30 veg. softgels</td>
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<td>00607</td>
<td>DHEA • 25 mg, 100 tablets (Dissolve in mouth)</td>
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<td>01478</td>
<td>DHEA COMPLETE • 60 veg. caps</td>
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<td>00335</td>
<td>DHEA • 25 mg, 100 caps</td>
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<td>00454</td>
<td>DHEA • 15 mg, 100 caps</td>
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<td>00882</td>
<td>DHEA • 50 mg, 60 caps</td>
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<td>DHEA • 100 mg, 60 veg. caps</td>
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**SUBTOTAL OF COLUMN 4**
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<td>ECHINACEA EXTRACT • 250 mg, 60 veg. caps</td>
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<td>ENDOTHELIAL DEFENSE™ w/ POMEGRANATE COMPLETE AND CORONARY™ • 60 softgels</td>
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<td>01937</td>
<td>EPA/DHA (Mega) • 120 softgels</td>
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<td>01737</td>
<td>ESOPHAGEAL GUARDIAN (Berry flavor) • 60 chewable tablets</td>
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<td>EUROPEAN LEG SOLUTION DIOSMISIN 95 600 mg, 30 veg. tabs</td>
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<td>01706</td>
<td>EXTRAORDINARY ENZYMES • 60 caps</td>
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<td>01514</td>
<td>EYE PRESSURE SUPPORT W/MIRTGENOL® • 30 veg. caps</td>
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<td>FACE MASTER® PLATINUM • Facial Toning System</td>
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<td>00965</td>
<td>FAST-ACTING JOINT FORMULA • 30 caps</td>
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<td>01717</td>
<td>FAST-C® W/DIHYDROQUERCETIN • 120 veg. tabs</td>
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<td>20053</td>
<td>FEM DOPHILUS® • 30 caps</td>
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<td>FEM DOPHILUS® • 60 caps</td>
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<td>FEMMENESSENCE MACAPAUSE® • 120 veg. caps</td>
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<td>20077</td>
<td>FIBERIMMUNE SUPPORT (Apple Cinnamon) 235 grams 600 mg, 30 veg. tabs</td>
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<td>00718</td>
<td>FIBRINORESIST® • 30 veg. caps</td>
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<td>01749</td>
<td>FLAX SEED (Organic golden) • 14 oz</td>
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<td>01821</td>
<td>FLORASSIST® HEART HEALTH PROBIOTIC • 60 veg. caps</td>
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<td>02311</td>
<td>FLORASSIST® ORAL HYGIENE • 30 lozenges</td>
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<td>FLORASSIST® BALANCE • 30 liquid veg. caps</td>
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<td>FLORASSIST® MOOD • 60 caps</td>
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<td>FLORASSIST® THROAT HEALTH • 30 lozenges</td>
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<td>01813</td>
<td>FOLATE HIGH POTENCY (Optimized) • 5,000 mcg, 30 veg. tablets</td>
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<td>FOLATE (Optimized) • 1,000 mcg, 100 veg. tablets</td>
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<td>01842</td>
<td>FOLATE + VITAMIN B12 (Bio Active) • 90 veg. caps</td>
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<td>01544</td>
<td>FORSKOLIN • 10 mg, 60 veg. caps</td>
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<td>FUCOIDAN W/MARITECH® 926 (Optimized) • 60 veg. caps</td>
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<td>00559</td>
<td>GAMMA E TOCOPHEROL/TOCOTRIENOLS • 60 softgels</td>
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<td>00759</td>
<td>GAMMA E TOCOPHEROL W/SESAME LIGNANS • 60 softgels</td>
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<td>01394</td>
<td>GARLIC (Optimized) • 200 veg. caps</td>
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<td>01122</td>
<td>GINGER FORCE® • 60 liquid caps</td>
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**SUBTOTAL OF COLUMN 5**

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<td>GINKGO BILOBA CERTIFIED EXTRACT™ 120 mg, 365 veg. caps</td>
<td>46.00 43.45 31.50</td>
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<td>00756</td>
<td>GLA WITH SESAME LIGNANS (Mega) • 60 softgels</td>
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<td>00345</td>
<td>(L- ) GLUTAMINE CAPSULES • 500 mg, 100 veg. caps</td>
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<td>00141</td>
<td>(L- ) GLUTAMINE POWDER • 100 grams</td>
<td>22.00 16.50 15.00</td>
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<td>00522</td>
<td>GLUCOSAMINE/CHONDROITIN CAPSULES • 100 caps</td>
<td>38.00 28.50 24.00</td>
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<td>01541</td>
<td>GLUTATHIONE, CYSTEINE &amp; C • 100 veg. caps</td>
<td>20.00 15.00 13.50</td>
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<td>01669</td>
<td>GLYCINE • 1,000 mg, 100 veg. caps</td>
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<td>01411</td>
<td>GRAPE SEED EXTRACT W/RESVERATROL &amp; PTEROSTILBENE 100 mg, 60 veg. caps</td>
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<td>01620</td>
<td>GREEN COFFEE EXTRACT COFFEEGENIC® 400 mg, 90 veg. caps</td>
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<td>00953</td>
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**SUBTOTAL OF COLUMN 6**
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<td>RETAIL</td>
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<td>LIFE EXTENSION MIX™ - 315 tablets w/o copper</td>
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<td>02064</td>
<td>LIFE EXTENSION MIX™ - 490 caps w/o copper</td>
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<td>02066</td>
<td>LIFE EXTENSION MIX™ POWDER - 14.81 oz w/o copper</td>
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<td>01608</td>
<td>LIVER EFFICIENCY FORMULA - 30 veg. caps</td>
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<tr>
<td>01639</td>
<td>5-LOX INHIBITOR W/APRÉSFLEX™ - 100 mg, 60 veg. caps</td>
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<tr>
<td>01678</td>
<td>L-LYSINE - 620 mg, 100 veg. caps</td>
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<tr>
<td>00455</td>
<td>LYCOGENE (Mega) - 15 mg, 90 softgels</td>
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**SUBTOTAL OF COLUMN 7**

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<th>ITEM No.</th>
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<td>01926</td>
<td>MACUGUARD® OCULAR SUPPORT - 60 softgels</td>
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<td>MACUGUARD® OCULAR SUPPORT w/ASTAXANTHIN 60 softgels</td>
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<td>MAGNESIUM (CITRATE) - 160 mg, 100 veg. caps</td>
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<td>MEDITERRANEAN TRIM WITH SINETROL™-XPUR 60 veg. caps</td>
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<td>01686</td>
<td>MELATONIN - 300 mcg, 100 veg. caps</td>
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<td>MELATONIN - 3 mg, 60 veg. caps</td>
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<td>MELATONIN - 10 mg, 60 veg. caps</td>
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<td>MELATONIN - 3 mg, 60 veg. lozenges</td>
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<td>MELATONIN (Fast-Acting Liquid) - 2 fl. oz (Citrus-Vanilla)</td>
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<td>MELATONIN TIMED RELEASE - 300 mcg, 100 veg. tabs</td>
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<td>MIGRA-EEZE™ (Butterbur) - 60 softgels</td>
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<td>MILK THISTLE (European) - 60 veg. caps</td>
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<td>MILK THISTLE (European) - 60 softgels</td>
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<td>MILK THISTLE (European) - 120 softgels</td>
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<td>MIRAFORTe w/STANDARDIZED LIGNANS (Super) - 120 caps</td>
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<td>MITOCOCHONDRIAL BASICS W/BIOPQQ® - 30 caps</td>
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<td>MITOCOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ® - 120 caps</td>
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<td>MK-7 - 90 mcg, 60 softgals</td>
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<td>MSM (Methylsulfonylmethane) - 1,000 mg, 100 caps</td>
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**SUBTOTAL OF COLUMN 8**
### Natural Mocha
- **12 oz. bag**: 200 mg, 30 enteric coated tablets (Optimized) • 30 veg. caps

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<td>Progestacare® for Women • 4 oz cream</td>
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<td>Prostate Formula (Ultra NAT) • 60 softgels</td>
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<td>01909</td>
<td>ProstatePolon® (Triple strength) • 30 softgels</td>
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<td>01742</td>
<td>Protein-Isolate (Whey) Vanilla • 403 grams</td>
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<td>01743</td>
<td>Protein-Isolate (Whey) Chocolate • 1 lb powder</td>
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<td>01770</td>
<td>Protein Concentrate (New Zealand Whey) Vanilla 520 grams</td>
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<tr>
<td>01771</td>
<td>Protein Concentrate (New Zealand Whey) Chocolate 660 grams</td>
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<td>01812</td>
<td>Provalin® Purified Omega-7 • 30 softgels</td>
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<td>01508</td>
<td>Pteropure® Pterostilbene • 50 mg, 60 veg. caps</td>
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<td>01209</td>
<td>Pumpkin Seed Extract (Water-soluble) • 60 veg. caps</td>
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<td>01637</td>
<td>Pycogenol® French Maritime Pine Bark Extract 100 mg, 60 veg. caps</td>
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<td>01217</td>
<td>Pyridoxal 5'-Phosphate • 100 mg, 60 veg. caps</td>
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<td>01309</td>
<td>Quercetin (Optimized) • 250 mg, 60 veg. caps</td>
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<td>01300</td>
<td>Red Yeast Rice (Bluebonnet) • 600 mg, 60 veg. caps</td>
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<td>Regimint • 60 enteric-coated caps</td>
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<td>Reishi Extract Mushroom Complex • 60 veg. caps</td>
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<td>01448</td>
<td>Rejuvenex® Body Lotion • 6 oz</td>
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<td>01621</td>
<td>Rejuvenex® Factor Firming Serum • 1.7 oz</td>
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<td>Rejuvenex® (Ultra) • 2 oz</td>
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<td>Rejuvenex® (Ultra) • 2 oz</td>
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<td>Resveratrol W/Pterostilbene • 100 mg, 60 veg. caps</td>
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<td>Resveratrol W/Nicotinamide Riboside (Optimized) • 30 veg. caps</td>
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<td>Resveratrol (Optimized) • 60 veg. caps</td>
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<td>Rhodiola Extract • 250 mg, 60 veg. caps</td>
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<td>01900</td>
<td>Ribogen® French Oak Wood Extract 200 mg, 30 veg. caps</td>
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<td>00972</td>
<td>(D) Ribose Powder • 150 grams</td>
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<tr>
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<td>(D) Ribose Tablets • 100 veg. tabs</td>
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<td>01609</td>
<td>Rich Rewards® Breakfast Ground Coffee • 12 oz bag</td>
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<td>01730</td>
<td>Rich Rewards® Breakfast Blend Ground Coffee Natural Mocha • 12 oz bag</td>
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<td>01729</td>
<td>Rich Rewards® Breakfast Blend Ground Coffee Natural Vanilla • 12 oz bag</td>
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<td>01612</td>
<td>Rich Rewards® Breakfast Blend Whole Bean Coffee 12 oz bag</td>
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<td>01610</td>
<td>Rich Rewards® Decaffeinated Roast Ground Coffee 12 oz bag</td>
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<td>01208</td>
<td>R-Lipoic Acid (Super) • 240 mg, 60 veg. caps</td>
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<tr>
<td>00070</td>
<td>RNA Capsules • 500 mg, 100 caps</td>
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### Subtotal of Column 9

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<td>01932</td>
<td>Saffron W/Satireal® (Optimized) • 60 veg. caps</td>
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<tr>
<td>01935</td>
<td>Same (S-Adenosyl-Methionine) 200 mg, 30 enteric coated tablets</td>
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<tr>
<td>01933</td>
<td>Same (S-Adenosyl-Methionine) 400 mg, 30 enteric coated tablets</td>
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### Subtotal of Column 10

TO ORDER ONLINE VISIT: www.LifeExtension.com
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<th>4 Unit Each</th>
<th>10 Unit Each</th>
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<td><strong>URIC ACID CONTROL</strong> • 60 veg. caps</td>
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<tr>
<td></td>
<td><strong>VANADYL SULFATE</strong> • 7.5 mg, 100 veg. tablets</td>
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<tr>
<td></td>
<td><strong>VENOTONE</strong> • 60 caps</td>
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<td>0127</td>
<td><strong>VINCOCETINE</strong> • 10 mg, 100 veg. tablets</td>
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<td>00372</td>
<td><strong>B3 NACIN</strong> • 500 mg, 100 caps</td>
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<td>00098</td>
<td><strong>B5</strong> • 500 mg, 100 caps (Pantothenic Acid)</td>
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<td><strong>B6</strong> • 250 mg, 100 veg. caps</td>
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<td><strong>VITAMIN C w/DIHYDROQUERCETIN</strong> 1,000 mg, 60 veg. tablets</td>
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<td><strong>VITAMIN C w/DIHYDROQUERCETIN</strong> 1,000 mg, 250 veg. tablets</td>
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<td><strong>VITAMIN C POWDER</strong> (BUFFERED) • 454 grams</td>
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<td><strong>VITAMIN C-MAGNESIUM CRYSTALS</strong> (EFFERVESCENT) 180 grams</td>
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<td><strong>VITAMIN D3</strong> • 2,000 IU, 1 fl oz, Mint flavor</td>
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<td><strong>X-R SHIELD</strong> • 90 veg. caps</td>
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<td><strong>ZINC LOZENGES</strong> (Enhanced) • 30 veg. lozenges</td>
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**SUBTOTAL OF COLUMN 11**
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<th>C.O.D.s (ADD $7 FOR C.O.D. ORDERS)</th>
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</thead>
<tbody>
<tr>
<td>UPS OVERNIGHT add $16, UPS 2nd DAY AIR add $7, For Puerto Rico, US Virgin Islands, add $7, CANADA UPS EXPRESS Flat rate $17.50, UK Flat rate $25 USD, ALL OTHER INTERNATIONAL AIR WILL BE ADDED.</td>
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<tr>
<td>GRAND TOTAL (MUST BE IN U.S. DOLLARS)</td>
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**BILL TO ADDRESS**

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**SHIP TO ADDRESS**

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