IMPACT OF DIET ON REDUCING PSA LEVELS

Raging Debate About PROSTATE CANCER Prevention

Drugs That Suppress Prostate Malignancy

Advanced Diagnostics Improve Biopsy Sensitivity

Guard Against Winter Flu and Colds

PSA Screening Controversy

How Avodart® Slashes Prostate Cancer Risk

Joe THEISMANN
STAYING FIT AFTER 60

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**One softgel of Full-Spectrum Pomegranate™ contains:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
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<tr>
<td>POMELLA® Pomegranate (Punica granatum) Extract (fruit) [std. to 30% punicalagins (120 mg)]</td>
<td>400 mg</td>
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<tr>
<td>PomComplete™ Pomegranate (Punica granatum) Blend (flower extract and seed oil standardized to 22% (30 mg) punicic acid)</td>
<td>137.5 mg</td>
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**CONTROVERSY SURROUNDS PROSTATE CANCER PREVENTION**
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Each bottle of Two-Per-Day lasts 60 days, so members can obtain the benefits of this high-potency formula for as little as $6.75 per month.
Prostate Cancer Prevention Controversy

BY WILLIAM FALOON

My editorial in the May 2013 issue of this publication generated quite a bit of feedback and critique. Some Life Extension® members said it should be a mandatory part of physician education. Others raised concerns about the use of the PSA blood test as a screening tool, why I suggest Avodart® for certain men, and why drugs were mentioned since there are nutrients that function via similar mechanisms.

The most impressive critique came from Patrick C. Walsh, MD, who may be the most renowned prostate cancer expert in the world. Dr. Walsh was involved in identifying the genetic characteristic of hereditary prostate cancer and pioneered “nerve-sparing” surgery. I have urged hundreds of prostate cancer patients to travel to Johns Hopkins to have Patrick Walsh perform their surgery, as I consider him the finest in the world.

So when Dr. Walsh writes us, I pay attention, and Life Extension members should be informed that there are credentialed individuals that are against using drugs in the class of Avodart® for cancer prevention purposes.

Shortly after my editorial was published, the American Urological Association issued revised guidelines for PSA screening. They now say PSA screening should be mostly considered only for men aged 55-69.1 We vehemently disagree with this new recommendation and chastise this group for not emphasizing the need to devise safer and more efficient ways of performing prostate diagnostics.

To emphasize the seriousness of all this, the chart on this page shows the spiraling incidence of prostate cancer that occurs as men age. Autopsy results reveal that 85% of men have atypical cells in their prostate glands and 1 in 4 has cancer.2 While many men with atypical lesions or even malignant cells in their prostate do not ever progress to clinical disease, aging men cannot ignore this problem.

The public still accepts absurdly short life spans. We at Life Extension do not and that is just one reason why our position on prostate cancer differs from the mainstream. >
There is something to be said about attending live lectures as opposed to staying glued to our computer/TV screens. A good speaker can make an impact that you may forever remember.

I’ll never forget a lecture I attended in 1977 at a South Florida condominium social hall. The place was packed with retirees. The lecturer was over age 80 and passionately urged all men to visit a urologist once a year for a digital rectal exam. He began by reading a long list of the names of the many members of his retirement community who had suffered agonizing deaths from metastatic prostate cancer.

The lecturer understood that a digital rectal exam would not detect all prostate cancers, but he knew it could save lives. If the PSA blood test had been available at that time, I can only imagine how feverish this benevolent speaker would have been in advocating PSA tests to his fellow men.

Move forward 35 years and the federal government and some mainstream medical groups are recommending against PSA screening, which is more reliable than digital rectal exams, though both ideally should be done annually.1,3

What Makes Prostate Cancer Different?

Prostate cancer is unusual in that it has a blood marker called prostate-specific antigen (PSA) that can facilitate early detection, thereby enabling therapies to be employed before cancer spreads to regional lymph nodes or distant metastases occur.4

With the advent and widespread use of PSA screening, an argument can be made based on a large human study that huge numbers of men could be spared agonizing deaths from metastatic prostate cancer.5,6 The earlier diagnosis of prostate cancer, however, must be put into context of the individual patient to ascertain which men need to be treated and which men are reasonable candidates for active surveillance or “watchful waiting.”

The journal European Urology published a study in 2013 conducted on nearly 35,000 men aged 55-69.5 This data came from the European Randomized Study of Screening for Prostate Cancer, a major, robust study examining the impact of PSA screening over a median period of 13 years on prostate cancer mortality. The eye-opening conclusion was that men who underwent repeated PSA screening were 51% less likely to die from prostate cancer than men who did not undergo screening.5 If the statistics from this study are applied to the entire population of men aged 55-69 in the United States, PSA screening could potentially save over 80,000 lives in a 13-year period.6

The United States Preventive Services Task Force (USPSTF) published a report in 2012 recommending that men stop undergoing PSA screening.3

Life Extension disagreed with the USPSTF recommendation, particularly as it relates to our members to whom we are steadfastly committed. We know that in the absence of PSA screening, prostate cancer will once again be diagnosed at an advanced stage, when there is painful bulky disease and only a small chance of curative therapy.

The widespread use of PSA testing beginning in 1987 enabled doctors to identify prostate cancer at a greatly reduced stage of disease.7 If the dictum of the USPSTF is followed, a major advance in medicine will be erased.

The Staggering Statistics

Here is what the American Cancer Society says about prostate cancer in the United States:8
• About 238,590 new cases of prostate cancer will be diagnosed in 2013.
• About 29,720 men will die of prostate cancer in 2013.
• About 1 man in 6 will be diagnosed with prostate cancer during his lifetime.
• The average age at diagnosis is 67.
• Prostate cancer is the second leading cause of cancer death among American men.
• About 1 man in 36 will die from prostate cancer.

If prostate cancer were an infectious illness, there would be widespread panic. To put this in perspective, HIV infected less than 50,000 Americans in 2011.9

In 2013, the United States Preventive Services Task Force urged all Americans to undergo routine HIV screening.10

There are valid reasons for HIV screening, but almost five times more Americans are diagnosed with prostate cancer each year compared to HIV.8,9 The same government-funded Task Force that suggests universal HIV screening does not want aging men to benefit from early detection of prostate cancer. They maintain that the treatment is worse than the disease. They confuse the message conveyed by the PSA with the judgment and actions of physicians who too often are programmed toward invasive and expensive therapies.

Do we toss out the baby with the bath water, so to speak, because physicians are not taking the time, or possibly do not have the expertise to advise patients soundly? The actions of the USPSTF and the American Urological Association should be to fix the deficiency of the physician with strict guidelines, just as was done in the 1980s to alter the routine use of the radical mastectomy performed in almost every woman diagnosed with breast cancer.11

The United States Preventive Services Task Force (USPSTF) prefers aging men wallow in ignorance concerning their prostate health, which within the next decade will send death rates spiraling upwards. The USPSTF clearly wants aging men to bury their heads in the sand and not concern themselves about prostate cancer.

The hard statistics showing more than 238,000 newly diagnosed prostate cancer cases annually proves otherwise.8 While the USPTF recommendations will save government health programs billions of dollars in the short term, there will be catastrophic long term costs to pay when record numbers of men who could have been cured instead develop metastatic disease.

Why Life Extension Members Are Different

There are factors that influence mainstream recommendations that do not pertain to Life Extension members. The typical American male over age 60 is remarkably unhealthy, often suffering multiple underlying maladies relating to metabolic syndrome and other pathologies called “co-morbidities.”12 This is indicative of a state of disease in...
the biologic environment of the patient. A frank diagnosis (or indication) of prostate cancer should act as an early warning that something is amiss in the patient’s overall health and that further attention is warranted to various systems. Thus a diagnosis of prostate cancer need not be equated with invasive procedures such as radical prostatectomy, radiation therapy, cryosurgery, high intensity focus ultrasound, or androgen deprivation therapy, but with a call to the patient and physician to be alert to pathologic states that if corrected can stabilize or repair some or all of the systems that are amiss.

One reason the USPSTF believes that PSA screening should be halted is that so many men are already in such poor health they are likely to die of some other cause before prostate cancer becomes clinically relevant.3

This is the opposite of Life Extension members, who go to extraordinary efforts to slow aging and protect against degenerative disease. It would be irrational for healthy Life Extension members to stop PSA screening merely because their age group on average is in such poor overall health.

Few doctors today have comprehensive programs designed to reverse multiple underlying factors that lead to clinically-diagnosed prostate cancer. The typical aging person does not know about lifestyle changes, drugs, and nutrients that may keep an indolent cancer confined to the prostate gland.

Life Extension members have long been armed with this information and have access to health advisors to help guide them to more effective ways of working with their physician to improve their odds of keeping low-grade prostate cancer, or indications of low-grade prostate cancer (such as rising PSA), under control. This issue of Life Extension magazine is dedicated to reminding members and alerting the public about these novel approaches to disease prevention.

Most urologists believe when PSA reaches a certain level that their only choice is to perform needle biopsies. They often overlook existing tests, such as testing and properly analyzing blood results of free PSA percentage, PSA density, and PSA velocity, along with other diagnostics such as PCA3 urinary test and advanced non-invasive techniques that can provide additional insight that may reduce the need for invasive procedures.13-17 Urology patients are not always made aware of these non-invasive choices, and especially of the importance of measuring the PSA rise over time (PSA velocity) to help ascertain if prostate biopsy is warranted.

What clearly separates Life Extension members from the general public, however, are the aggressive steps we take to achieve meaningful extensions of our healthy life spans. Those advising against PSA screening are largely “writing-off” men over age 70.
Life Extension male members need to ensure their prostate health is assessed and maintained at an optimal level for the many decades of extended life they expect.

American Urological Association Capitulates

When the United States Preventive Services Task Force suggested that aging men stop PSA screening altogether, the American Urological Association disagreed. About a year later, the American Urological Association issued revised guidelines that will sharply reduce the number of PSA screenings performed.\(^1\) And other professional groups have issued similar opinions.\(^2\)

The latest recommendation from the American Urological Association (AUA) is for men over age 70 to avoid PSA screening.\(^1\) The AUA is essentially saying that once you move past age 70, your life span is too short to bother with.

The American Urological Association is also writing off men aged 40-54 for prostate screening because of the relative low incidence of cancer in this group compared to men over 54.\(^1\) This is a tragedy as it condemns younger men who do develop prostate cancer to probable death. Earlier diagnosis provides a huge advantage when attempting curative therapy. Just ask Prostate Cancer Foundation Chairman Michael Milken, who insisted on a PSA test at age 46 and discovered he had prostate cancer in time to benefit from curative therapy.\(^2\)

On the flip side are famous people like Frank Zappa, Telly Savalas, Bill Bixby, and other younger men who likely could have identified their prostate cancer earlier had they undergone PSA screening.\(^2\) These men probably had rising PSA levels long before metastatic disease manifested.

Overlooking More Efficient Procedures

In recommending more limited PSA-screening, the American Urological Association is tacitly admitting that conventional diagnostic and early treatment of prostate cancer is so inadequate, or performed so incompetently, that it’s better to wait for full-blown metastatic disease to manifest. Once advanced stage prostate cancer develops, however, treatments are seldom curative.

Instead of looking at physicians who are diagnosing and treating early stage prostate cancer using less invasive procedures and then emulating these skilled artists, the American Urological Association has apparently caved in to accepting and promoting mediocrity within their profession. A big problem is that most urologists are not properly assessing PSA results, nor are they efficiently implementing further diagnostic and treatment protocols. And on the other end of the spectrum are the many men who are promptly sent for ultrasound-guided biopsies after one PSA elevation. And again, to add insult to injury, the biopsies are often not ones targeted to abnormalities within the prostate but merely targeting the prostate as a gland.

It is one issue to biopsy an ultrasound lesion that may represent the needle in the haystack, but it’s another issue, and a sad one at that, when it is the haystack that is the target. You know that this is the case when a man has had 2, 3, or 4 prostate biopsies showing no cancer cells, and then he is referred, finally, to a competent physician who uses excellent ultrasound equipment to directly target suspicious lesions within the prostate gland.
Prostate Cancer
Not an Isolated Disease

A common mistake made by doctors and patients is thinking that prostate cancer manifests in isolation from other pathological events occurring as a person ages. This is not the case.

Research shows that other serious pathological conditions are frequently seen in prostate cancer patients. These factors involved in prostate malignancy can adversely impact other parts of the body.

For example, Life Extension has shown one way prostate cancer and coronary atherosclerosis are related is that they are both influenced by the breakdown of bone. As an aging man develops osteoporosis, excess calcium released into the blood contributes to arterial calcification. What’s lost in the bone ends up in the coronary arteries and other major vessels of the body.

These atherosclerotic lesions are not vascular “calcifications” but bone growth or osteogenesis. Bone breakdown also releases growth factors into the blood that promote the proliferation of what may have been indolent prostate cancer cells. Therefore, it should come as no surprise that nutrients that prevent bone loss such as vitamin K2 also inhibit vascular calcification.

PSA screening thus provides an important clue of a man’s overall health, with the advantage of identifying problems early enough to take effective corrective actions. That’s a LOT of benefit for assessing one’s prostate gland once a year utilizing PSA blood testing.
an increase in PSA is not only of importance insofar as prompting investigations to rule out prostate cancer. We have evidence that PSA breaks down natural barriers that keep isolated tumor cells confined to regions within the prostate gland. Remember that PSA is a serine protease, an enzyme that breaks down proteins. One such containment protein degraded by PSA is the extra-cellular matrix, i.e., the natural barrier that may confine cancer cells within the prostate gland.

But suppressing DHT alone is not a total solution. There are other prostate tumor growth promoters such as insulin, estrogen, prolactin, transforming growth factor beta (TGF-1 and TGF-2), and vascular endothelial growth factor (VEGF) that also should be brought under control. Fortunately, many of the nutrients Foundation members already take can help suppress growth factors used by prostate cancer cells (and other cancers) to proliferate.33-52

There are other mechanisms involved in the evolution of a prostate tumor such as 5-lipoxygenase (5-LOX)53-55 and cyclooxygenase-2 (COX-2)56 that can be markedly improved by dietary changes, along with curcumin,57-58 fish oil,59-61 boswellia,62 aspirin,63 Zyflamend®64-68 and prescription COX-2 inhibitors like Celebrex®69,70

Genetic factors involved in prostate cancer initiation and promotion may be favorably modulated by taking relatively high doses of vitamin D71,72 Hormonal influences like prolactin and insulin can benefit from using prolactin-suppressing drugs like cabergoline (Dostinex®)73 or Lisuride74 and the insulin-suppressing drug metformin.75-77

The overriding goal in reversing any cancer is to induce favorable changes in the genes that regulate cell proliferation and apoptosis (cell destruction). We know that nutrients like curcumin,78-80 genistein,81-84 fish oil,85,86 and vitamin D87,88 favorably affect genes involved in carcinogenesis, as do drugs like aspirin,89,90 metformin,91-93 finasteride (Proscar®)94 and dutasteride (Avodart®)95

THE WHOLISTIC NATURE OF HEALTH IN RELATION TO PROSTATE CANCER.
As we learn more about specific health issues we see evidence of the interconnectedness of all key processes involved in mind and body functions. This should come as no surprise since this phenomenon characterizes all living entities, from the atom to the universe.
Those who pioneered aggressive dietary changes to help treat cancer were decades ahead of their time. While it’s unlikely that aggressive dietary alterations will cure clinically diagnosed prostate cancer, there are strong mechanistic values to consuming foods/beverages that suppress prostate cancer proliferation (like cruciferous vegetables\textsuperscript{109-111} and green tea\textsuperscript{112,113}) as opposed to continuing to eat foods that have been related to higher prostate cancer risk such as red meat,\textsuperscript{114-116} starches and sugars,\textsuperscript{117,118} excess dairy,\textsuperscript{115,119-121} and excess omega-6 fats that contribute to a high omega-6:omega-3 ratio.\textsuperscript{122,123}

**Importance of Food Choices**

What one eats (and doesn’t eat) makes a huge impact on whether prostate cancer ever develops.\textsuperscript{102,103} Healthier eating patterns also improve the odds of treatment success.\textsuperscript{104,105}

A rising PSA level or prostate cancer diagnosis can be the signal that it’s time to switch what you eat more towards a Mediterranean diet that focuses on fish instead of red meat, whole vegetables instead of glucose-spiking starches/sugars, foods cooked at lower temperatures, and reduced intake of omega-6 fats.\textsuperscript{106-108}

If a needle biopsy of the prostate detects a malignancy, it will be graded with a Gleason score number as follows:

**Under 7** (low-grade): Slow growing and not likely to be aggressive.\textsuperscript{96} Low-grade prostate cancers are seldom the cause of death in men over age 70, especially those that are in poor health.\textsuperscript{97} Low-grade are the majority of prostate tumors found and the ones where “watchful waiting” is often employed in lieu of radical procedures.\textsuperscript{97,98}

**Over 7** (high-grade): Fast growing, aggressive tumors that require intervention such as radical prostatectomy, radiation, androgen ablation, etc.\textsuperscript{96} High-grade prostate tumors make up less than 15%\textsuperscript{*} of newly diagnosed prostate cancers.\textsuperscript{99}

\*Caveat: Errors in the pathology lab can result in lethal mistakes, such as issuing a low Gleason score to a high-grade tumor. These errors are discovered when a radical prostatectomy is performed and it is found to have a Gleason score of 8-10 as opposed to a 6 Gleason score found in the biopsied specimen.\textsuperscript{100}

A study published in 2012 evaluated a group of men with early-stage prostate cancer who received a 4,000 IU vitamin D3 supplement each day for a year.\textsuperscript{101}

Mean 25-hydroxyvitamin D blood levels at baseline were 32.8 ng/mL and increased to 66.2 ng/mL after vitamin D supplementation.\textsuperscript{101}

After one year, 55% of the men showed a decrease in tumor sensitive biopsies or a decrease in the Gleason tumor score. An additional 11% showed no change (meaning the cancer had not progressed).

The study also showed that over time, supplementation with vitamin D3 led to a decrease in the number of positive cores taken during prostate biopsies. This is in stark contrast to the untreated control group who experienced an increase in the number of positive cores on repeat biopsies.\textsuperscript{101}

Only 34% of men taking vitamin D progressed compared to 63% of the control group. This represents a 46% reduction in the number of men who moved to advancing disease, indicating powerful effects of taking 4,000 IU/day of vitamin D for one year.

The men in this study had not received any other treatment than vitamin D and all were in an active surveillance program that carefully measured disease progression or regression.

This study showed that just one intervention (4,000 IU/day/vitamin D) was able to reverse the clinical course of disease in a significant percentage of these prostate cancer patients.

This study helps validate the importance of PSA screening. Had these men not known they had early-stage prostate cancer, they would not have known to take vitamin D, and their disease would have likely progressed until symptoms such as bone pain manifested.
The first article in this month’s issue titled, “Impact of Diet on Prostate Cancer Risk and Mortality” describes foods that promote prostate cancer and which ones protect against it. We explain how consuming the wrong foods can fuel prostate cancer growth, while following healthy dietary choices can reduce the risk that you will develop clinically diagnosed prostate cancer.

Some men instinctively start eating healthier as they mature, but it took a higher PSA reading (1.4 ng/mL) ten years ago for me to alter my diet in a healthier direction. My diet is not perfect, but it’s a huge improvement over what I consumed in my younger years. My last PSA test came in at 0.4 ng/mL...a 71% decrease in a ten-year period (PSA levels normally rise with age).

If I had not had my PSA checked annually, I may have continued making poor dietary choices and may have developed prostate cancer by now. My father was diagnosed with it around age 75. He consumed a typical diet for his era, with a daily intake of red meat and high glycemic starches like potatoes, while never touching a vegetable or fruit. He set himself up perfectly to encourage prostate cancer growth and mutation.

Even for those who aren’t sure if they are making the proper food choices, laboratory tests like the Omega Score® test (a fatty acid profile) enable one to evaluate their diet and supplement program and make changes to optimize health. You are what you eat and what you assimilate does have a bearing on your health.

A More Rational Approach

Most prostate tumors are very sensitive to their internal environment or what we prefer to call their “biological milieu.” We know this because when androgen-deprivation therapy is properly administered, PSA levels can drop to near zero and prostate cancer cells die through the process of programmed cell death, a.k.a. apoptosis.124,125

However, it is not uncommon for prostate cancers to eventually find other growth factors to fuel their continued proliferation and the anti-proliferative and pro-apoptotic effects of androgen-deprivation therapy wear off, as evidenced by a continuously rising PSA that was once brought down...
For example, a recent study found that men taking finasteride for prostate cancer prevention were far more likely to benefit if they had lower estrogen levels prior to initiation of treatment with finasteride. This study clearly showed high concentrations of estrogen to be associated with increased cancer risk. So much so that the elevated estrogen neutralized the prostate cancer prevention impact of finasteride.

Life Extension has repeatedly warned aging men about the critical need of achieving estrogen balance. One reason was our continued observation of high estrogen levels in newly diagnosed prostate cancer patients. Men can easily suppress elevated estrogen levels with aromatase-inhibiting therapies.

So in response to a rising PSA and/or other indicators of prostate disease, men have a range of diagnostic options to assess whether there is underlying malignancy and if there is, what may be helping to fuel it (such as elevated DHT or estrogen).

If non-invasive diagnostics indicate malignancy, a color Doppler ultrasound-guided biopsy can indicate whether it may be high-grade (Gleason score over 7 that requires treatment) or low-grade (Gleason score under 7 that may be controlled with comprehensive surveillance/intervention).

Some Life Extension members choose to attack a rising PSA as if there is already low-grade prostate cancer present, especially if they suffer urinary symptoms relating to benign prostate hyperplasia (enlargement). In consultation with their doctor, they may choose to take 0.5 mg of Avodart® daily (though it may not need to be taken every day) and simultaneously introduce an arsenal of mechanistic approaches to restrain benign and/or tumor cell propagation and induce benign and/or tumor cell apoptosis.

For example, when a diagnosis of prostate cancer occurs in the setting of a rising PSA in the lower range (below 4 ng/dL ideally), Life Extension views this as an opportunity for early intervention that might result in one’s body regaining control over tumor expansion.

We know that the drug Avodart® (dutasteride) lowers PSA levels by inhibiting the formation of dihydrotestosterone (DHT). Avodart® and its less potent cousin Proscar® (finasteride) are 5ARIs (5-alpha reductase inhibitors). 5-alpha reductase is the enzyme that converts testosterone to DHT. The effect of DHT on prostate cancer cell growth is five times greater than that of testosterone. By blocking DHT, drugs like Avodart® and Proscar® provide a unique opportunity to suppress tumor growth. At the same time, comprehensive adjunct protocols can be initiated that are designed to deprive tumor cells of growth factors or fuels, further inhibiting cancer growth and/or invasion.

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The use of Avodart® or finasteride can shrink prostate gland volume by 25% thus relieving benign symptoms, improve the accuracy of a needle biopsy if this diagnostic procedure is needed, and deprive tumor cells of one growth promoter, i.e. DHT. The comprehensive arsenal of mechanistic approaches might involve healthy eating, high doses of specific nutrients (at least temporarily), hormone adjustment aimed at reducing DHT, insulin, prolactin and estrogen (but maintaining free testosterone in youthful ranges), and drugs like metformin and aspirin. If
**prolactin** levels are elevated, the drug **Dostinex®** (carbergoline) can be used to suppress this cancer stimulating pituitary hormone.

I know this paradox has troubled aging men for decades, but according to a number of observations and some published studies, **low** levels of testosterone seem to predispose men to prostate cancer, including more **high-grade** Gleason score tumors. One explanation is that only **low** levels of testosterone are needed to convert into excess **dihydrotestosterone** (DHT). When prostate cells are deprived of their **free testosterone**, they may mutate to overrespond to other growth vehicles such as estrogen, insulin-like-growth factor, and DHT.

Genetic Tests for Men Undergoing Prostate Biopsy

About half of US men diagnosed with prostate cancer are classified as low-risk by use of conventional measures such as Gleason score (a form of tumor grading), the prostate-specific antigen test (PSA), and a physical exam. Nonetheless, nearly **90%** of these low-risk patients will choose to undergo immediate aggressive treatment such as radical prostatectomy or radiation even though there is less than a **3%** chance of deadly progression.

A new test called **Oncotype DX** is now available to physicians and their patients. It measures the level of expression of **17 genes** across four biological pathways to predict prostate cancer aggressiveness.

Test results are reported as a **Genomic Prostate Score (GPS)** ranging from **0 to 100**; this score is assessed along with other clinical factors to clarify a man’s risk prior to treatment intervention. This multi-gene test can be used in conjunction with the needle biopsy sample taken before the prostate is removed, thereby providing the opportunity for low risk patients to avoid invasive treatments. According to the principal investigator of the validation study, “Individual biological information from the Oncotype DX prostate cancer test almost **tripled** the number of patients who can more confidently consider active surveillance and avoid unnecessary treatment and its potential side effects.”

The advantage of this test for those who choose the **comprehensive surveillance program** utilized by Life Extension members (which involves the use of several drugs, targeted nutrients, and adherence to healthy dietary patterns) is to provide greater assurance the right course of action is being followed.

For information about the **Oncotype DX** test, log on to www.oncotypedx.com.

**Prolaris®** is another genomic test developed to aid physicians in predicting prostate cancer aggressiveness in conjunction with clinical parameters such as Gleason score and PSA.

Prolaris® measures prostate cancer tumor biology at the molecular level. By measuring and analyzing the level of expression of genes directly involved with cancer replication, Prolaris may be able to more accurately predict disease progression.

Prolaris® is a tool designed to measure the aggressiveness of a patient’s cancers to better predict and stratify an individual’s relative risk of disease progression within ten years. It may enable physicians to better define a treatment/monitoring strategy for their patients.

Prolaris® claims to be significantly more prognostic than currently used variables and provides unique additional information that can be combined with other clinical factors in an attempt to make a more accurate prediction of a patient’s cancer aggressiveness and therefore disease progression.

Prolaris® has been shown to predict clinical progression in four different clinical cohorts, in both pre and post-treatment scenarios.

In the treatment of prostate cancer, Prolaris® is prognostic at the point of diagnosis and in the post-surgery setting.

At diagnosis, Prolaris® can help to identify patients with less aggressive cancer who may be candidates for active surveillance. In addition, Prolaris® can define patients who appear clinically low-risk but have a more aggressive disease that requires more aggressive treatment.

Prolaris® testing is also well suited for use in post-prostatectomy patients that have higher risk features after surgery to better estimate their risk of disease recurrence and therefore adjust the level of monitoring or add additional therapy.

For more information about Prolaris®, log on to the company website: www.myriad.com
The Development of BENIGN PROSTATIC HYPERPLASIA

Muscle contraction causing urinary “urgency”

Urinary retention

Bladder

Enlarged prostate

Constricted urethra

To penis

Cell proliferation causes enlargement of the prostate, constricting the urethra and interfering with the normal flow of urine.

DNA replication and cell division

Rapid cell proliferation

Prostate cell

Testosterone conversion

Dihydro-testosterone

Estrogen Receptor

Protein Kinase C

Growth factors and other stimuli

Testosterone Receptor

Insulin

Estrogen

Testosterone

Protein Kinase C

The Development of BENIGN PROSTATIC HYPERPLASIA

Cell proliferation causes enlargement of the prostate, constricting the urethra and interfering with the normal flow of urine.
How Life Extension Differs From the Mainstream

A common approach to dealing with biopsied-confirmed low-grade prostate cancer is called “watchful waiting.” Under this scenario, PSA tests are performed at reasonable intervals and treatment decisions based on indicators of disease progression (or regression).

In the presence of persistently rising PSA and other markers, the patient and their doctor discuss wide ranges of treatment options ranging from surgical removal of prostate gland, different forms of radiation, cryoablation, and/or androgen ablation to temporarily reduce PSA and buy more time. All of these treatment modalities have side effects to consider.

Instead of merely “watching” a PSA rise until risky therapies are required, we at Life Extension view a low-grade prostate cancer (or even a biopsy that reveals no cancer) as an opportunity to intervene aggressively with a multitude of non-toxic approaches that benefit one’s overall health. Success or failure is measured by monthly PSA testing, along with other tests to ensure that other growth factors like insulin, estrogen, DHT, and prolactin are being adequately suppressed.

To clarify the point about a no cancer diagnosis, the accuracy of typical initial needle biopsies today is only around 75%. So if your urologist tells you he has good news, i.e., the biopsy showed no tumor cells in your prostate gland, there may be a 25% chance you do have tumor cells, thus making the kinds of comprehensive intervention that benefits your entire body a rational choice.

So rather than “watchfully wait,” as your underlying disease may progress, we suggest comprehensive intervention. The objective is to take away every route that enable tumor cells to propagate and escape confinement within the prostate gland.

For those who require a prostate biopsy, there are new (and expensive) genetic tests (described on page 17) that may more accurately predict which tumors are aggressive and likely to metastasize and those that are so indolent that only minimal changes may be needed to keep control over them. If these genetic tests prove themselves in the clinical setting (outside the bias of company sponsored clinical trials), intelligently using the results of these tests can spare many men from needless treatments and provide information about genetic mutations to target in prostate cells may enable better long-term control.

Our Enlarging Prostate Glands

Aging results in a proliferation of prostate cells that is technically referred to as benign prostatic hyperplasia (BPH). The graphic on page 18 depicts an advanced case of BPH with a constricted urethra that would impede or block urine flow.

Illustrations on page 20 show a normal prostate gland compared to an extreme case of BPH. Symptoms associated with BPH include frequent urination and urinary hesitancy that can be especially troublesome at night. In severe cases obstruction of urine flow requires insertion of a catheter into the bladder via the penile urethra.

A major culprit involved in the benign over-proliferation of prostate cells is dihydrotestosterone (DHT). Drugs such as Avodart®

Enhanced Diagnostic Procedures

What patients should understand is the diagnosis of prostate cancer per ultrasound-guided biopsies is also related to the skill of the physician performing the procedure, as well as the nature of the ultrasound (gray-scale versus color Doppler). CDU (color Doppler ultrasound) also indicates the degree of vascularity (angiogenesis) of the cancer, which if present is a factor associated with tumor aggressiveness. The more vascular the cancer the more aggressive it is. Dietary approaches, supplements, and medications to reduce angiogenesis should be considered in the arsenal of how we prevent the emergence or evolution of clinically significant prostate cancer.

An additional emerging area that may allow a better understanding of clinically significant prostate cancer and clarify the issue of risk of high-grade prostate cancer with 5-alpha reductase inhibitor drugs like Avodart® and Proscar® involves replacing the transrectal ultrasound of the prostate (TRUSP) with MRI utilizing parameters such as DWI (diffusion weighted imaging) and the associated grading of DWI using the Apparent Diffusion Coefficient (ADC). Studies indicate a much higher specificity for the diagnosis of prostate cancer than TRUSP when DWI and ADC are used together.
degrading barrier structures in the prostate gland that may contain isolated tumor cells.

What troubles Dr. Walsh and some other experts is that some of the men taking Avodart® or finasteride who do contract prostate cancer have been shown in two studies to develop more aggressive forms of the disease. They are so concerned that they warn men not to use these drugs for the purpose of prostate cancer prevention, as does the FDA.

On the flip side are proponents of these drugs who point out that Avodart® as well as Proscar® (finasteride) reduce prostate gland volume by such a degree that the ability to identify high-grade tumors via prostate biopsy is improved. So it does not appear that Avodart® or Proscar® cause more high-grade tumors. Instead, these drugs facilitate earlier detection of such cancers, which is another reason to consider taking them.

A frustration with needle biopsies is that they miss up to 20-30% of prostate cancers.134,151,152 The larger one’s prostate gland, the easier it is to have the biopsy miss those sites that are malignant. The illustration on page 21 depicts a 12-core biopsy to show why a larger prostate gland makes it more difficult to detect malignant cells. So an advantage of shrinking one’s prostate gland using drugs like Avodart® or Proscar® is that if a needle biopsy is required, it may more accurately detect underlying malignancy.153

As you’ll read in the article in this issue titled The Avodart®-Proscar® Debate, there is compelling evidence that these drugs may reduce high-grade prostate cancer risk.

Another virtue to using 5-alpha reductase inhibitors (like Avodart® or Proscar®) is that in the presence of prostate cancer, PSA levels don’t decrease as much after these drugs are initiated.140-142

(dutasteride) or Proscar® (finasteride) reduce DHT levels and shrink the size of an enlarged prostate gland, which reduces BPH symptoms.139 These drugs also lower PSA levels by almost 50%, which may reflect the mechanism(s) that explain why men taking these drugs have reduced overall prostate cancer risk.140-142 In two large studies, men taking Avodart® or Proscar® had about a 24% reduced risk of prostate cancer.143,144

Men should know that testosterone is not the culprit behind prostate problems. Numerous studies suggest that youthful levels of testosterone do not increase prostate cancer risk.145-150 What happens in the aging man’s body, however, is that testosterone converts to estrogen and DHT, and these two testosterone metabolites have been shown to be involved in benign and malignant prostate disease. Fortunately, there are low-cost methods available to suppress DHT and estrogen in aging men, while maintaining youthful ranges of free testosterone.

Recall that PSA is not just a marker of prostate cancer, but functions as a tumor promoter by converting to estrogen and DHT, and these two testosterone metabolites have been shown to be involved in benign and malignant prostate disease. Fortunately, there are low-cost methods available to suppress DHT and estrogen in aging men, while maintaining youthful ranges of free testosterone.

The graphic above depicts an extreme advanced case of BPH with a constricted urethra that would impede or block urine flow. Symptoms associated with BPH include frequent urination and urinary hesitancy that is especially troublesome at night.
Physicians using 5-alpha reductase inhibitors should take into account the PSA-lowering effect of these agents by doubling the PSA lab value.\textsuperscript{156} Given that PSA decreases less in the presence of prostate cancer, the doubling of PSA will result in a higher value of PSA and will trigger the need for diagnostic investigations sooner.

What doctors have observed is that drugs like Avodart\textsuperscript{®} or finasteride suppress PSA levels more effectively in men with benign prostate enlargement or low-grade prostate cancer. When PSA levels drop then start raising again, this indicates that the 5-alpha reductase inhibitor is reducing low-grade cells of questionable clinical significance but is not affecting higher grade malignancies.\textsuperscript{131} This finding is another plus for using a 5-alpha reductase inhibitor as it can increase the sensitivity of the PSA test to reveal which men need aggressive diagnostics such as needle biopsies.

### Why We Suggest Certain Drugs

When it comes to combating cancer, \textit{Life Extension} long ago learned that the initial treatment regimen should be aggressive enough to deprive tumor cells of an opportunity to mutate into forms that are resistant to future therapies. If we know of a relatively side-effect-free drug that works via a single or multiple mechanisms to impede tumor survival, we’re going to include it in our comprehensive surveillance program.

Let’s talk first about metformin. It was used in England in 1958 but did not make it into the United States until 1995—37 years later!\textsuperscript{157} I am familiar with metformin because the FDA tried to have me incarcerated for recommending it as an anti-aging drug long before it was “approved” to treat type II diabetes.

What’s been happening over the last ten years is an explosion of published studies that consistently show that metformin reduces the risks of certain tumors and may be an effective cancer treatment.\textsuperscript{158-165} People ask me all the time, how can an anti-diabetic drug work so well against cancer? The encouraging news is that metformin functions via multiple mechanisms to create a less favorable environment for tumor progression.\textsuperscript{166-175} We know that insulin (and glucose) increase the risk of many tumors.\textsuperscript{176} This is of particular concern to obese men with prostate tumors. Metformin lowers blood glucose and insulin levels. The sidebar on the next page reveals the multiple anti-cancer mechanism of metformin. There are nutrients that can have similar effects such as standardized green coffee extract.\textsuperscript{177}

We nonetheless suggest that a man with an elevated or rising PSA should ask his doctor to consider prescribing metformin. The starting dose can be 500 mg of extended release (Metformin ER) taken with breakfast each day. Under the supervision of the patient’s local medical doctor, the dose can be increased to 500 mg ER taken at breakfast and at dinner. (Dose ranges for non-extended release metformin are 250-850 mg taken before no more than three meals a day.) Metformin is an inexpensive generic drug and can be taken along with nutrients (like green coffee extract) that similarly function to reduce glucose/insulin.

Metformin does more than slash tumor-promoting glucose/insulin levels. It also acts directly on cancer cells to induce apoptosis and/or inhibit proliferation.\textsuperscript{91} Metformin does this conserving the process by which food is converted to energy.\textsuperscript{169-172} Healthy cells react to metformin by adjusting their functions to use less energy.

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This diagram depicts a 12-core needle biopsy of a prostate gland. Note how many areas of the prostate are missed during biopsy.

In the PCPT (Prostate Cancer Prevention Trial) where only 6 core biopsies from 6 regions of the gland were obtained, the effect of Proscar\textsuperscript{®} in reducing gland volume was to increase the ability to detect high-grade prostate cancer.\textsuperscript{131,192}
A cancer cell, on the other hand, that is forced to minimize energy consumption is less able to exhibit aggressive metastatic or proliferative behavior. In other scenarios, the energy stress caused by metformin is sufficient to cause cancer cell death.

The National Cancer Institute is sponsoring a clinical study where metformin will be tested to see if it can slow the progression of prostate cancer in men undergoing active surveillance (watchful waiting) with low-grade tumors. We hope the study design includes the measurement of 2-hour postprandial (2 hours after meals) blood glucose levels as well as glycosylated hemoglobin (HbA1c) to ascertain that optimal dosing of study subjects has been achieved.

At a cancer conference earlier this year, the results of a study were reported of 22 men (median age 64, median PSA 6 ng/mL) with confirmed prostate cancer that were given 500 mg of metformin three times a day 41 days prior to surgery (prostatectomy). In response to metformin the men showed the expected reductions in glucose and insulin growth factor-1 (IGF-1) blood levels, along with abdominal fat loss. What got the researchers excited was that compared to biopsied specimens, the surgically removed prostate glands showed a 32% reduction in a marker of cell proliferation (Ki-67) and a favorable alteration in a pathway tumor cells use to proliferate out of control (via mTOR). Knowledgeable members point out that curcumin interferes with these tumor growth pathways via similar mechanisms, which we at Life Extension have long been familiar with. My argument for recommending metformin is that it should produce potent additive effects to curcumin. Moreover, we still don’t know what the upper dose limits are for metformin and/or curcumin for cancer treatment, so taking both may have some obvious advantages.

Furthermore, because metformin is a drug, it tends to get more attention from researchers, perhaps because it is easier to obtain funding for drug studies. A European study published this year showed that metformin was effective against advanced castration-resistant prostate cancer. The doctors who conducted this study concluded:

To our knowledge, our results are the first clinical data to indicate that metformin use may improve PSA-recurrence free survival, distant metastasis-free survival, prostate cancer specific mortality, overall survival and reduce the development of castration resistant prostate cancer in prostate cancer patients. Further validation of metformin’s potential benefits is warranted.

Interestingly, men who are on androgen deprivation therapy to treat prostate cancer often show rising insulin levels that can stimulate tumor growth. By taking metformin, some of the side effects of androgen deprivation therapy can be mitigated, as was shown in this newly published European study. So while nutrients like curcumin and green coffee extract...

### Anti-Cancer Actions of Metformin

Numerous studies show the anti-diabetic drug metformin can slow growth of existing cancers and decrease risk of developing new cancers. Some studies show metformin may protect against prostate cancer and aid in treatment. Here are some of its anti-cancer mechanisms:

- **Metformin** reduces levels of glucose, insulin, and insulin-like growth factors that fuel tumor growth.
- **Metformin** activates a powerful molecule called AMPK (adenosine monophosphate-activated protein kinase) that subjects cancer cells to unique metabolic stresses not experienced by healthy tissues. (Activated AMPK promotes death [apoptosis] of malignant cells and prevents their development.)
- **Metformin** independently inhibits mTOR (mammalian target of rapamycin) that regulates cell growth, energy metabolism, cell motility, cell survival, and protein synthesis.
- **Metformin** mimics the benefits of a hormone called adiponectin in activating AMPK-dependent growth inhibition in prostate cancer cells.
- **Metformin** blocks cancer cell reproductive cycles by decreasing levels of a growth-promoting protein called cyclin D1.
- **Metformin** increases production of a protein (p27) that inhibits the cell division cycle.
- **Metformin** suppresses vascular endothelial growth factor (VEGF) thereby cutting off the blood supply to tumors.
As we see it

As I have related in the past, when my PSA reading came back at 1.4 ng/mL in year 2003, I treated it as if I had early stage prostate cancer by adopting healthier dietary choices and taking every nutrient and drug that had shown efficacy in prostate cancer prevention. Ten years later my PSA is 0.4 ng/mL.

I will remain on an aggressive prostate cancer treatment regimen and in the process reduce my risk for virtually every other age-related disease.

The articles in this month’s issue provide comprehensive approaches for the prevention of prostate cancer, including a comprehensive overview demonstrating the prostate cancer prevention benefits in response to Avodart® and finasteride. Men with any type of prostate malignancy may also benefit, as the programs we advocate for prevention may also facilitate better overall treatment.

For longer life,

William Falloon

What if PSA Screen Detects a Potential Problem?

If an annual PSA screen reveals a potential problem, a man has an early opportunity to:

1. Review state-of-the-art studies to establish his status regarding the presence of prostate cancer.
2. Confirm the diagnosis and get a Gleason score reading by an expert in prostate cancer pathology.
3. Utilize published nomograms and neural nets to present the patient probabilities of organ-confined prostate cancer, capsular penetration, or disease progression to seminal vesicles and/or lymph nodes.
4. Obtain refined laboratory studies and imaging studies to confirm or refute the above.
5. Sit down with a physician that is least biased on a particular procedure and discuss the pros and cons of all therapies, including active surveillance.
6. Investigate and discuss all co-related illnesses that might have gone unrecognized but that play a role in stimulating prostate cancer growth.

Treat Yourself As If You Already Have Prostate Cancer

This article is supposed to be about prostate cancer prevention, and here I am talking about therapies overlooked by most doctors that may facilitate enhanced treatment outcomes.

The reason we can’t ignore treatments is that aging men should accept the reality that in all likelihood there are malignant cells in their prostate glands now. This makes it easier to consistently follow prevention programs that can reduce the risk that clinically diagnosed disease will ever manifest. It also keeps one on the lookout for non-toxic treatments that may also have preventative benefits.

Aspirin functions in multiple ways to interfere with prostate cancer propagation and metastasis and it may induce genetic changes that facilitate apoptosis. There is too much data about the potential role of aspirin as an adjuvant cancer treatment for men with rising PSA not to use it.

Daily Use of Aspirin May Decrease Prostate Risks

Researchers studied 2,447 men over 12 years, examining them every other year. After adjusting for age, diabetes, hypertension, and other factors, they found that men who took a daily aspirin or another NSAID (like ibuprofen) reduced their risk of moderate or severe urinary symptoms by 27% and lowered their risk of an enlarged prostate by 47%. Even more intriguing was the finding that men who consumed aspirin or another NSAID were 48% less likely to have an elevated level of prostate-specific antigen (PSA).

Aspirin inhibits the cyclooxygenase (COX-1 and COX-2) enzymes, which are also involved in the arachidonic acid inflammatory pathway. COX-2 in particular is known to promote the proliferation of prostate cancer cells.

and others may share functions that are similar to metformin, we cannot ignore the strong data showing specific benefits to low-cost metformin.

Another hormone that prostate tumors use to escape eradication is prolactin, and this can easily be suppressed by taking 0.25 mg to 0.5 mg of cabergoline (Dosintex®) two to three times weekly.

Aspirin functions in multiple ways to interfere with prostate cancer propagation and metastasis and it may induce genetic changes that facilitate apoptosis. There is too much data about the potential role of aspirin as an adjuvant cancer treatment for men with rising PSA not to use it.
Don’t Accept Archaic Diagnostics

The highly variable skills of the urologist performing TRUSP (transrectal ultrasound guided needle biopsy of the prostate) is of great concern when a biopsy is needed.

Too often the urologist uses the TRUSP to target the prostate gland per se, rather than abnormal areas within the prostate. Rarely do we see a dedicated TRUSP report that mentions all of the important findings that can and should be related by the urologist e.g., gland volume, PSA density, status of the capsule and seminal vesicles, as well as location of hypoechoic and hyperechoic lesions within the prostate. Using the TRUSP to target the prostate gland, and not the various lesions within the gland is akin to diluting a vintage wine with ice cubes. (For illustration and a description of a model TRUSP report, see Appendix F of the book A Primer on Prostate Cancer by Strum and Pogliano available from Life Extension Media by calling 1-800-544-4440 or logging on to www.lef.org)

The varying quality of the ultrasound device and whether it is a standard gray-scale ultrasound or a color Doppler ultrasound is also significant. Color Doppler ultrasound, for instance, discloses pathologic states of increased blood vessel growth (angiogenesis) that is associated with more clinically aggressive prostate cancer, which is often of a higher Gleason score.18 MRI (magnetic resonance imaging) using DWI (diffusion weighted imaging) will also add to understanding the risk a particular patient with prostate cancer faces. That’s because when color Doppler ultrasound is combined with MRI-DWI, a predictive value regarding the level of aggressiveness of the prostate cancer may be established.19

In this manner, selecting only those men whose prostate cancers are most likely to be “bad actors” and who need invasive therapy can be accomplished, while sparing those men with cancers of low grade, which are often amenable to changes in lifestyle, diet, and use of supplements.

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156. Andriole GL, Marberger M, Roehrborn CG. Clinical usefulness of serum prostate specific antigen for the detection of prostate cancer is preserved in men receiving the dual 5α-reductase inhibitor dutasteride. J Urol. 2006 May;175(5):1657-62.


Bone Restore combines critical bone boosting nutrients into one superior formula.

Bone Restore includes highly absorbable forms of calcium and boron, along with vitamin D3, magnesium, zinc, manganese, and silicon. Bone Restore is available with or without vitamin K2 (MK-7).

Bone Restore now contains 300 mg of magnesium. The retail price for 120 capsules of Bone Restore is $24. If a member buys four bottles, the price is reduced to $16.50 per bottle. (Item# 01727)

The same Bone Restore formula without vitamin K2 (MK-7) is available as well. The retail price for 120 capsules is $22. If a member buys four bottles, the price is reduced to $14.25 per bottle. (Item# 01726)

Just four capsules of Bone Restore provide:

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
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<tr>
<td>Highly Absorbable Calcium</td>
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<tr>
<td>(as DimaCal® dicalcium malate, TRAACS® calcium bisglycinate chelate, calcium fructoborate)</td>
<td></td>
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<tr>
<td>Vitamin D3</td>
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<tr>
<td>Vitamin K2 (as menaquinone-7)</td>
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<tr>
<td>Magnesium (as magnesium oxide)</td>
<td>300 mg</td>
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<tr>
<td>Boron</td>
<td>3 mg</td>
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<tr>
<td>(calcium fructoborate as patented FruiteX B® OsteoBoron®)</td>
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<tr>
<td>Zinc (as zinc amino acid chelate)</td>
<td>2 mg</td>
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<tr>
<td>Manganese (as amino acid chelate)</td>
<td>1 mg</td>
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<tr>
<td>Silicon (from horsetail extract)</td>
<td>5 mg</td>
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</tbody>
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Note: Those who take Super Booster or Super K usually do not need additional vitamin K2. They should order Bone Restore without vitamin K2. Those taking the anti-coagulant drug Coumadin® (warfarin) should use BONE RESTORE without vitamin K2.

Fruitex B® and OsteoBoron® are registered trademarks of VDF FutureCeuticals, Inc. U.S. patent #5,962,049. DimaCal® and TRAACS® are registered trademarks of Albion Laboratories, Inc. Malate is covered by U.S. Patent 6,706,904 and patents pending.

To order Bone Restore, 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.
ULTIMATE PROSTATE PROTECTION

At Life Extension®, we continually update our formulas to reflect the latest research findings.

Ultra Natural Prostate formula has been upgraded to include the most scientifically substantiated nutrients to help protect the prostate gland and maintain its healthy function.

The new Ultra Natural Prostate formula contains thymoquinone—a potent compound found in black cumin seed. Here are the eleven ingredients in the new Ultra Natural Prostate:

- **Thymoquinone** targets prostate cells to promote healthy apoptosis (orderly removal of senescent cells). The 10 milligrams of thymoquinone in this formula is the same amount contained in around 2.5 grams of black cumin seed oil!

- **Standardized lignans** from flax seed and Norway spruce knotwood convert to enterolactone in the intestine, which is then absorbed into the bloodstream to provide support for prostate cells against excess estrogen levels. Testosterone often converts to estrogen at higher rates as men age—and prostate cells are sensitive to estrogen’s growth stimulatory effects.

- **AprèsFlex®,** an extract of *Boswellia,* supports normal inhibition of 5-lipoxygenase or 5-LOX, an enzyme that is associated with undesirable cell division changes. AprèsFlex® absorbs into the blood nearly 52% better than standard Boswellia, for superior effectiveness.

- **Nettle root extract** helps support prostate cells against excess estrogen levels by mitigating the activity of the aromatase enzyme needed to create estrogens.

- **DeepExtract™ USPlus® saw palmetto extract** helps inhibit dihydrotestosterone (DHT) activity in the prostate, helps inhibit alpha-adrenergic receptor activity (to support normal urinary flow), and helps regulate inflammatory reactions in the prostate. DeepExtract™ is a patented, state-of-the-art, ultra-high pressure CO2 extraction technology that ensures the most complete bioactive extract profile available. This results in a superior formula containing key ingredients in higher concentrations than many other extracts.

To order Ultra Natural Prostate, call 1-800-544-4440 or visit www.LifeExtension.com

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Now With Thymoquinone

- **Pygeum** (*Pygeum africanum*) extract helps suppress prostaglandin production in the prostate and supports healthy urination patterns.26,27
- **Pumpkin seed supercritical CO2 oil**, from select pumpkins, enhances the composition of free fatty acids and augments saw palmetto's benefits.28-30
- **Beta-sitosterol** is a biologically active constituent of pygeum and saw palmetto31 that enhances pygeum's protective effects and helps improve quality of life.32,33
- **Graminex® Flower Pollen Extract**, a European pollen extract has been shown to help relax the smooth muscles of the urethra and help regulate inflammatory reactions.34-36
- **Boron** has been shown to slow elevation of prostate-specific antigen (PSA), seemingly a result of this mineral's positive effect on the body's regulation of protein-degrading enzymes.37-39
- **Lycopene**, a carotenoid associated with the tomato's red color, supports efficient cellular communication, helps maintain healthy DNA, regulates hormonal metabolism, and promotes healthy prostate size and structure.40-46

**Ultra Natural Prostate** formula—now with thymoquinone—presents the latest scientifically validated, standardized botanical extracts shown to promote healthy prostate function. No other prostate protection formula provides such a broad array of nutrients to support the multiple factors involved in supporting the aging prostate gland.

A bottle of 60 softgels of Ultra Natural Prostate retails for $38. If a member buys four bottles, the price is reduced to $26.25 per bottle.

References
5. ApresFlex® is a registered trademark of Laila Nutraceuticals exclusively licensed to PL Thomas - Lalia Nutra LLC. International patents pending. HMRlignan™ is a trademark used under sublicense from Linnea S.A. USPlus® and DeepExtract™ are trademarks of Valensa International and are used under license. US Patents 6,319,524 and 6,669,968. Albion® is a registered trademark of Albion Laboratories, Inc.

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Enjoy Dairy Again with Less Worry!

When you take a LACTOSOLV™ Long-Lasting Lactase capsule 10-15 minutes before your first bite of dairy, you’re free to enjoy your favorite dairy food while minimizing concern about later discomfort—secure in the assurance that your lactase supplement won’t quit on you before its job is done!

The suggested dosage of one (1) capsule of Life Extension® LACTOSOLV™ Long-Lasting Lactase taken 10 to 15 minutes prior to consuming lactose-containing foods or beverages provides:

Some people experience occasional digestive issues when consuming lactose—the milk sugar found in dairy products.

Commercial lactase supplements may not provide sufficient protection or relief. The reason is that most lactase supplements quickly lose their protective ability.1 As a result, many people still continue to experience digestive discomfort from eating dairy foods even after taking standard lactase supplements. Fortunately, scientists in Europe have developed a long-lasting lactase called LACTOSOLV™ that provides an effective solution.

Long-Lasting Support

Most lactase supplements function best in a highly acidic pH environment such as that of the stomach.2,3 This means that standard lactase supplements have a very brief window of time during which they can attack the lactose load. Several capsules may be needed to break down an average lactose-containing meal.1,3

But LACTOSOLV™ enteric-coated pellets become active upon entering the nearly neutral pH environment of the small intestine.1 The small intestine is where the digestive enzyme lactase is naturally produced to break down lactose.

LACTOSOLV™ greatly extends the window of activity of supplemental lactase, working over hours instead of merely minutes.1 This results in longer-lasting support for the digestion of foods containing lactose!

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**Positive Lifestyle Changes Associated with Longer Telomeres**

The results of a study described in *The Lancet Oncology* reveal that improvements in diet, exercise, stress management, and social support are associated with longer telomeres (DNA-protein complexes at the end of chromosomes which shorten with cellular aging).*

The current study included 35 men with low-risk prostate cancer who had elected to undergo active surveillance. Ten men participated in the lifestyle intervention and 25 served as controls. Blood samples collected from the subjects at the beginning of the study and after five years were analyzed for peripheral-blood mononuclear cell telomere length and telomerase levels.

Men who engaged in the lifestyle program had telomeres that were 10% longer on average at the end of the study, while the control group experienced an average 3% decrease in length. Greater adherence to lifestyle recommendations was associated with a corresponding increase in telomere length.

*Editor’s Note:* The lifestyle program consisted of a diet high in whole foods, plant-based protein, fruit, vegetables, grains, and legumes that was low in fat and refined carbohydrates; a moderate aerobic exercise regimen, stress management consisting of yoga, meditation and relaxation, and weekly support group sessions.

—D. Dye

* *Lancet Oncol.* 2013 Sep 16.

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**Chronic Inflammation Impacts Healthy Aging**

In the *Canadian Medical Association Journal*, Tasnime N. Akbaraly, PhD, of France’s Institut National de la Santé et de la Recherche Médicale and colleagues report that high levels of interleukin-6, which are elevated during chronic inflammation, are associated with a reduction in successful aging, which they define as the absence of chronic diseases and disability coupled with optimal physical, cognitive, cardiovascular, and respiratory functioning.*

The study analyzed data from 3,044 middle-aged participants in the Whitehall II study, which examined 10,308 British civil servants every five years beginning in 1985. Subjects were categorized as having undergone successful aging, cardiovascular disease, noncardiovascular death, or normal aging over a 10-year follow up beginning in 1997-1999.

Elevated levels of interleukin-6 reduced the odds of experiencing successful aging by 47%, elevated the risk of undergoing cardiovascular events by 64%, and more than doubled the risk of noncardiovascular death in comparison with subjects whose levels were lower.

*Editor’s Note:* A high level of interleukin-6 was defined as more than 2.0 nanograms per liter at the two points at which it was measured. Supplements that help suppress IL-6 include: EPA, B6, DHEA, lycopene, luteolin, resveratrol, quercetin, and genistein among others.

—D. Dye

* *CMAJ.* 2013 Sep 16.
B Vitamin Supplementation Could Lower Stroke Risk

The results of a meta-analysis published in the journal *Neurology* indicate that supplementing with B vitamins could reduce the risk of experiencing a stroke.*

Yuming Xu of Zengzhou University and colleagues selected 14 randomized, double-blinded trials that included a total of 54,913 subjects for their analysis. B vitamins administered in the trials included folate or folic acid, vitamin B6 and vitamin B12, and control groups were given a placebo or a very low-dose supplement. Follow-up times ranged from 24 to 80 months, during which 2,471 strokes occurred.

All studies but one uncovered a decrease in supplemented subjects of serum homocysteine which, when elevated, is a risk factor for stroke. Reductions in serum homocysteine ranged from 3.1 to 10.4 mmol/L in vitamin-supplemented groups. When all trial participants were analyzed, overall stroke risk was reduced by 7% as a result of homocysteine reduction among supplemented participants in comparison with the control subjects.

*Editor’s Note:* The authors conclude that, “B vitamin supplementation for homocysteine reduction significantly reduced stroke events, especially in subjects with certain characteristics who received appropriate intervention measure.”

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Antioxidant Could Prevent Chemo Side Effect

An article published in the *Annals of Neurology* reveals that ethoxyquin, an antioxidant frequently used as a preservative in pet food, could help prevent peripheral neuropathy in patients treated with the chemotherapy drug paclitaxel (Taxol®).* Peripheral neuropathy is characterized by pain, numbness, and tingling in the extremities that can often persist years after the drug has been discontinued.

By screening over two thousand compounds, Dr. Höke and his colleagues discovered that ethoxyquin and its derivatives protected against paclitaxel-induced peripheral neuropathy without affecting its ability to kill cancer cells. Giving ethoxyquin to mice treated with paclitaxel prevented two-thirds of the in-nerve degeneration that occurred in animals that did not receive the protective compound. The researchers hope to use the finding to develop a drug for humans undergoing paclitaxel treatment.

*Editor’s Note:* The authors remark that, “Ethoxyquin and its novel derivatives as well as other classes of small molecules that act as heat shock protein 90 modulators may offer a new opportunity for development of drugs to prevent chemotherapy induced axonal degeneration.”

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Weight Gain Linked to Poor Gut Bacteria

An article published in the journal *Nature* reports the MetaHIT consortium’s finding of an association between gut bacterial “richness” and protection against obesity.*

The current research compared the gut bacterial genes of 169 obese and 123 nonobese Danish men and women. It was discovered that approximately one-fourth of the participants had up to 40% fewer gut bacterial genes than the remainder of the study population and correspondingly fewer bacteria. This group also had less bacterial diversity. Subjects with low bacterial richness were significantly likely to have more adiposity or to be obese and to have gained more weight over the previous nine years. They were also more insulin resistant, more likely to be dyslipidemic, and had an increase in markers of inflammation and white blood cells, indicating a greater risk for diabetes or heart disease.

*Editor’s Note:* The research team identified eight bacterial species as possibly preventive against weight gain. The findings could lead to new therapies for obesity or the development of diagnostic tests to identify those at risk of diseases linked to gut microbiome alterations.

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* *Neurology.* 2013 Sep 18.

* *Ann Neurol.* 2013 Sep 19.

* *Nature.* 2013 Aug 29;500(7464):541-6.
Americans Are Living Longer and Healthier

A study described in the American Journal of Public Health may help put to rest concerns that the longer life span looked forward to by the average American is bought at the price of an increased period of disability.* In a recent article, Allison Rosen, MD, and her colleagues report that not only can younger Americans expect to live longer than their counterparts of twenty years ago, but they can also anticipate that more of those years will be spent healthy.

Dr. Rosen and her colleagues utilized data derived from the National Medical Expenditure Survey, National Health Interview Survey, Medical Expenditure Panel Survey, National Nursing Home Survey, and Medicare Current Beneficiary Survey. They determined that, in comparison to untreated cells. The team found that DHA suppressed PARP1, AQP4, and PLA2, which are factors potentiated by alcohol consumption, and that blocking PARP1 reduces binge alcohol-induced neurotoxicity.

Dr. Collins emphasized that the amount of alcohol consumed by abusers still needs to be reduced in order to help protect brain function.

Editor's Note: In a previous analysis of 143 studies, Dr. Collins found an association between moderate social drinking and a lower risk of dementia and cognitive impairment. However, consuming larger amounts of alcohol results in inflammation, leading to increased oxidative stress and brain cell death, which is responsible for the greater risk of dementia experienced by alcoholics.

—D. Dye

* 14th Congress of the European Society for Biomedical Research on Alcoholism, 2013 Sep 8-11. Warsaw, Poland.

Green Tea and Vitamin E Enhance Exercise Benefits in Older Men and Women

In an article published in the Journal of the American College of Nutrition, Israeli researchers report that drinking green tea and supplementing with vitamin E was associated with a reduction in waist circumference and fasting glucose among older adults who participated in a 12-week exercise program.*

Twenty-two men and women received three cups of green tea and 400 IU vitamin E per day or a placebo over the course of an exercise program that involved 30 minutes of moderately intense walking six days per week. Although diet remained unchanged, all participants experienced a reduction in weight and fasting glucose levels.

Average waist circumference declined from 39.7 inches to 38.15 inches among men who received green tea and vitamin E, and women's waists declined from 37.7 inches to 33.5 inches by the end of the study. The green tea/vitamin E group additionally experienced a decrease in fasting glucose levels.

Editor's Note: Plasma protein carbonyls (a marker of oxidative stress) were also reduced, which was accompanied by a significant rise in red blood cell catalase activity at the end of the study period (indicating increased antioxidant protection) in the supplemented group.

—D. Dye


Omega-3 Fatty Acid Could Help Protect the Brain From Effects of Alcohol

Results from a study presented at the 14th Congress of the European Society for Biomedical Research on Alcoholism, suggest a protective effect for docosahexaenoic acid (DHA), an omega-3 polyunsaturated fatty acid, against the development of dementia in alcoholics.*

Dr. Collins and his associates administered DHA or no treatment to cultured adult rat brain cells prior to exposure to an amount of alcohol four times the legal limit established for driving. They observed a 90% reduction in neuroinflammation and neuronal death in DHA-treated cells in comparison to untreated cells. The team found that DHA suppressed PARP1, AQP4, and PLA2, which are factors potentiated by alcohol consumption, and that blocking PARP1 reduces binge alcohol-induced neurotoxicity.

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Trial Finds Benefit for Lycopene and Lutein in Adults with Subclinical Atherosclerosis

The results of a trial reported in the *British Journal of Nutrition* reveal an association between supplementation with the carotenoids lycopene and lutein and a reduction in carotid intima-media thickness (CAIMT), which is a measure of atherosclerotic plaque. The study included 144 men and women with subclinical atherosclerosis, defined as CAIMT greater than 0.75 millimeters among those aged 59 years or younger and greater than 0.85 millimeters for subjects aged 60 and older. Participants were randomized to receive 20 milligrams lutein, 20 milligrams lutein plus 20 milligrams lycopene, or a placebo daily for one year. Doppler ultrasonography conducted at the beginning and end of the trial evaluated carotid artery intima-media thickness. While average carotid artery intima-media thickness did not change in the placebo group after a year, a significant reduction was observed in those who received lutein and among those who received lutein and lycopene.

Editor’s Note: Participants who received both lutein and lycopene experienced the greatest reduction in CAIMT.

—D. Dye


Lower Diabetes Risk Found in Men with Higher Omega-3 Polyunsaturated Fatty Acid Levels

An article published in *Diabetes Care* reports an association between higher serum levels of omega-3 polyunsaturated fatty acids and a reduction in the risk of type II diabetes. Researchers at the University of Eastern Finland evaluated data from 2,212 men who participated in the Kuopio Ischaemic Heart Disease Risk Factor Study. Blood samples were analyzed for the omega-3 fatty acids EPA, DPA, DHA, and ALA, and hair samples were analyzed for mercury, a common contaminant of fish that may modify the effect of omega-3 fatty acids on diabetes risk by increasing insulin resistance. Over a 19.3 year average follow-up, type II diabetes was diagnosed in 422 subjects. Men whose combined serum EPA, DPA, and DHA levels were among the top 25% of participants had a risk of diabetes that was one-third less than those whose levels were among the lowest fourth.

Editor’s Note: When individual long-chain fatty acids were analyzed, DHA and DPA emerged as protective against type II diabetes. No effect of mercury on diabetes risk was found.

—D. Dye

*Diabetes Care.* 2013 Sep 11.

Alpha Lipoic Acid, Inositol Reduce Metabolic Syndrome in Postmenopausal Women

The journal *Trials* reported the outcome of a study which found a benefit for supplementing with alpha lipoic acid and inositol among postmenopausal women with metabolic syndrome.

The trial included women who had three or more of five metabolic syndrome components, and who were at increased risk of breast cancer as determined by family history or history of borderline lesions. Participants were instructed to consume a low-calorie diet and received alpha lipoic acid and inositol, or a placebo for six months.

While the low-calorie diet slightly improved insulin resistance in the placebo group, a significant decrease in insulin occurred among 89.3% of women who received alpha lipoic acid and inositol, and a reduction in insulin resistance was observed in 66.7%. A greater percentage of women who received the supplements experienced reductions in triglycerides, waist circumference, and waist to hip ratio, as well as a significant increase in HDL.

Editor’s Note: Metabolic syndrome is a cluster of symptoms that increase the risk of cardiovascular disease and diabetes. Postmenopausal women with metabolic syndrome are at greater risk of breast cancer than the rest of the female population.

—D. Dye

Published studies have shown the critical importance of lipoic acid in supporting healthy mitochondrial function. Unlike other forms of lipoic acid, Super R-Lipoic Acid is more bioavailable, stable, and potent, achieving 10-30 times higher peak blood levels than pure R-lipoic acid. This unique sodium-R-lipoate can help you reach peak plasma concentrations within just 10-20 minutes of supplementation. Super R-Lipoic Acid provides more of the active “R” form of lipoic acid than any other supplement.

A bottle of Super R-Lipoic Acid containing 60 vegetarian capsules retails for $49. If a member buys four bottles, the cost is only $33.75 per bottle. Each capsule contains 300 mg of stabilized, Bio-Enhanced® Super R-lipoic acid supplying 240 mg of R-lipoic acid. Suggested dose is one capsule daily.

References

CAUTION: Because this product may lower blood glucose, consult your healthcare provider before taking this product if you are taking glucose lowering medication. Bio-Enhanced® is a registered trademark of Geronova Research, Inc.
ARE YOU TAKING THE OPTIMAL FORMS OF VITAMIN E?

According to the Proceedings of the National Academy of Sciences, alpha tocopherol (vitamin E) displaces critically important gamma tocopherol in the cells. While alpha tocopherol inhibits free-radical production, gamma tocopherol is required to trap and neutralize existing free radicals.

Prestigious scientific journals have highlighted gamma tocopherol as one of the most critically important forms of tocopherols, which includes d-alpha tocopherol (natural vitamin E) for those seeking optimal health benefits.

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

SESAME LIGNANS: THE NATURAL VITAMIN E BOOSTER

Life Extension* has uncovered research suggesting that adding sesame lignans to gamma tocopherol may significantly enhance its beneficial effects. Sesame and its lignans have been shown to boost antioxidant levels and help maintain already-normal blood pressure.*

In a human study that combined gamma tocopherol with sesame lignans, gamma tocopherol/sesame was 25% more effective than gamma tocopherol/tocotrienols in suppressing tissue measurements for free-radical and inflammatory damage. Since tocotrienols are considered nature’s most potent antioxidants, the fact that low-cost gamma tocopherol with sesame is more effective is a remarkable finding.

Life Extension fortified the popular Gamma E Tocopherol supplement with standardized sesame lignans extract long ago. Consumers thus obtain superior benefits at a much lower cost.

WORLD’S MOST COMPREHENSIVE VITAMIN E FORMULA!

The Gamma E Tocopherol with Sesame Lignans formula provides potent doses of critically important gamma tocopherol along with sesame lignans to augment its antioxidant effects. Suggested dose is one softgel once or twice daily.

The retail price for 60 softgels of Gamma E Tocopherol with Sesame Lignans is $32. If a member buys four bottles, the price is reduced to only $21.75 per bottle.

Each softgel of Gamma E Tocopherol with Sesame Lignans provides:

- Gamma tocopherol: 197.45-269.25 mg
- Delta tocopherol: 71.8-107.7 mg
- Alpha tocopherol: 30.52-43.08 mg
- Beta tocopherol: <17.95 mg
- Sesame seed: 20 mg (Sesamum indicum) lignan extract

Contains soybeans.

Antioxidant Vitamins & Cancer. Some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer. However, the FDA does not endorse this claim because this evidence is limited and not conclusive.

NOTE: Those taking Super Booster do not usually require additional gamma tocopherol.

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

References

To order Gamma E Tocopherol with Sesame Lignans, 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.
In 2003, the Life Extension Foundation® introduced a standardized resveratrol extract shown to favorably alter genes implicated in the aging process—many of the same genes that respond to calorie restriction.

Since then, we have identified additional compounds that simulate calorie restriction’s ability to trigger youthful gene expression—the process by which genes transmit signals that slow certain aspects of aging.

Compelling evidence reveals that certain compounds found in berries, such as pterostilbene and fisetin, possess potent “longevity gene" activators that work in synergy with resveratrol. For example, fisetin (found in strawberries) has been shown to stabilize resveratrol in the body by shielding it from metabolic breakdown, thus extending its beneficial effects.

High-Potency Resveratrol with Synergistic Activators

Life Extension® members gain access to standardized trans-resveratrol combined with botanical extracts that favorably influence longevity gene expression. Unlike many commercial formulas, Life Extension standardizes to trans-resveratrol, which researchers contend is the most active constituent.

A bottle containing 60 vegetarian capsules of Optimized Resveratrol with Synergistic Grape-Berry Actives retails for $46. If a member buys four bottles, the price is reduced to $31 per bottle. The suggested dose of one capsule a day provides:

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To order Optimized Resveratrol with Synergistic Grape-Berry Actives, 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.
Prostate cancer is a leading cause of cancer death among men. Yet, only about 15% of new prostate cancer diagnoses require immediate and aggressive treatment.1,2 The majority of newly diagnosed prostate cancer cases have low- or intermediate-risk malignancies. For men with low risk malignancies, oncologists sometimes practice “watchful waiting” or “active surveillance,” monitoring parameters such as prostate-specific antigen (PSA) to evaluate tumor progression.3,4 This approach can delay the need for aggressive treatment, and in many cases is turning out to reduce or eliminate the need for surgery, chemo, or radiation therapy.3

During this period of watchful waiting, there is an additional option that has been shown to lower PSA. A landmark study from the United Kingdom has demonstrated that a combination of four foods—a fruit (pomegranate), an herb (green tea), a spice (turmeric), and a vegetable (broccoli)—concentrated into a pill, dramatically slowed markers of prostate cancer growth by a median of nearly 64%.5
Working closely with the National Cancer Research Network, this formula was developed based on extensive documentation showing how certain foods function to slow prostate cancer growth. We begin this report with a critical review of this groundbreaking study conducted on human prostate cancer patients.
The subjects were then randomly assigned to receive either a twice-daily oral capsule containing a blend of pomegranate seed, green tea, turmeric, and broccoli, or an identical placebo for 6 months. At baseline, there were no significant differences between the two groups, except that the placebo group was on average 4 years older than the treatment group. Neither the doctors supervising the trial nor the men knew whether they were taking a placebo or the test product.

The men in the study had their PSA levels measured at baseline, at 3 months, and at 6 months, to determine the rate of rise. The results were remarkable. In the placebo group, PSA levels rose by a median of 78.5% over the 6-month period, while in the supplemented group, PSA rose by a median of only 14.7%, a statistically significant 63.8% difference.5

In addition, and importantly, 46% of men in the supplemented group had a stable or lower PSA by the end of the study, compared with just 14% of the placebo group; again, this was a significant difference, and suggested that in nearly half of the treated men, their cancers had stopped growing or had even regressed.

### Why PSA Matters in Prostate Cancer

PSA and PSA kinetics are the primary markers to follow disease progress in men with known cancer of the prostate gland.83,84 But PSA is more than just a marker; we now realize that it is an enzyme that degrades the matrix proteins holding cells together.28 That is one way the cancer invades and spreads.

A tumor that produces a rapidly rising PSA, therefore, is one at risk for breaking out of the prostate gland itself and spreading either into local tissue or forming distant metastases, both of which place the patient at high risk of death.95

That's why physicians and patients should follow PSA levels carefully once a prostate tumor has been discovered. And that's why therapies that lower PSA are not just producing an encouraging marker, they are in fact demonstrably slowing disease progression and lowering the patient's risk of dying.

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Landmark UK Study: Food Pill Slows Evidence of Prostate Cancer Growth

In June of 2013, the American Society of Clinical Oncology included in its program a report on a “food pill” that had a dramatic impact on men with prostate cancer.5 For those who don't know, the annual conference of the American Society of Clinical Oncology (ASCO) is where many cancer treatment breakthroughs are announced to the world.

The study reported at the ASCO conference was an exploration of the role of four polyphenol-rich foods with known anti-cancer properties.5 The trial development team worked in partnership with the UK government’s National Cancer Research Network, which ensured the highest scientific credibility and quality assurance. They extensively scrutinized the clinical and laboratory data for foods that have a high chance of an anti-cancer effect. They came up with a specific blend of four cancer-fighting foods concentrated into a capsule designed to be taken twice daily. They then set out to test its effect in the most rigorous of scientific trials—a double-blind placebo-controlled randomized trial within which they examined its effect on prostate-specific antigen, or PSA.

The researchers recruited 203 men aged 53 to 89 years (average age 74 years) with prostate cancer proven by biopsy.5 Fifty-nine percent of the men had not yet undergone any treatment and were being followed closely with periodic PSA measurements, while 41% had already had a radical intervention (surgery, chemotherapy, or radiation) but had relapsed with climbing PSA levels.
In another remarkable measure, just 7.4% of supplemented men being monitored by active surveillance or watchful waiting required a change in management plan, while 26% of those in the placebo group required a change in their management plan.5 In other words, the supplement directly supported the decision to defer care and avoid painful, costly, and invasive procedures in this group of men.

Following the success of this trial, the research team is designing a range of new scientific trials involving this unique fruit and vegetable blend collaborating with academic cancer centers across the world. These include men already taking androgen deprivation therapies, or those in PSA remission following successful primary treatments such as surgery, brachytherapy, or radiotherapy. They are also partnering with clinicians outside the urology cancer field to determine its effect on osteoarthritis, chronic breast pain, hot flushes, and even tinnitus, and hopefully the results of these trials will be available by early 2015.

Let’s now look more closely at each of the ingredients in this new prostate-cancer-fighting food pill, to see what each one brings uniquely to the formula and how each reinforces the other to reduce the risk of prostate cancer progression.

**Pomegranate**

Pomegranate compounds suppress enzymes in the intestine and liver that convert certain molecules (procarcinogens) into cancer-causing agents.6,7 As it relates to those with prostate cancer, the active constituents in pomegranate have proven to be potent inducers of malignant cell death through **apoptosis**.8-16

During the development of androgen independence, prostate cancer cells are known to increase testosterone synthesis inside their own cells, which maintains cancer cell growth in the absence of significant amounts of circulating testosterone. Overexpression of the **androgen receptor** occurs in androgen-independent prostate cancer and has been proposed as another mechanism promoting the development of androgen independence. Pomegranate has been shown to inhibit expression of the **androgen receptor** and **androgen synthesizing genes** in prostate cells, which helps block an important survival mechanism utilized by prostate cancer cells to escape eradication.17

Multiple basic laboratory and human studies have demonstrated that pomegranate treatment, specifically various active compounds, slows PSA doubling time and reduces production of PSA in malignant prostate cells.12,14,18,19

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**What You Need to Know**

**Functional Foods as Powerful Combatants Against Prostate Cancer**

- Prostate cancer becomes a killer when it invades or metastasizes; prior to those events it can be detected and successfully treated.
- But too many men with prostate cancer undergo needless and invasive surgery, chemo-, or radiation therapy.
- A new pill containing concentrated forms of four functional foods has now been shown to significantly slow the rise of PSA, the major marker of prostate cancer progression.
- The components, pomegranate, green tea, turmeric, and broccoli, have all independently been shown to have protective effects on prostate tissue; a new study demonstrates that they can work together in concert to slow the disease in men who already have prostate cancer.
- Each food component works by different, but powerful, epigenetic mechanisms to modify the way prostate cells regulate their growth and development.
- Using all four in one simple pill optimizes both prevention and treatment of prostate cancer, without significant side effects.
Green Tea

Green tea makes a unique contribution to the prostate-cancer-fighting pill as a result of a special combination of naturally occurring polyphenols called catechins.25-28

Studies show that one of green tea’s catechins, EGCG, accumulates specifically in prostate tissue, where it selectively kills cancer cells (leaving healthy cells unaffected) and reduces serum PSA levels.29-34

In a further demonstration of the cancer-suppressing role of green tea, when researchers studied men with a pre-cancerous condition called prostate intraepithelial neoplasia, they found only one tumor after one year in the 30 men given green tea polyphenols, while the 30 placebo recipients developed nine cancers.30 The treatment was safe, and as an extra bonus was found to reduce other lower urinary tract symptoms as well.

Green tea is already acknowledged as a cancer preventive in Japan because of epidemiological studies documenting prostate cancer risk reduction of up to 86% in men who drink the most green tea.31,35-37

Laboratory studies point to still other anti-cancer effects from green tea. Its components reduce genetic expression and activity of androgen receptors that most prostate cancers need to survive.34,38-40 Green tea also induces human cancer cell death by apoptosis through a variety of epigenetic mechanisms.24,41,42 And recent studies reveal polyphenols in brewed green tea shut off new blood vessel growth, important in slowing cancer development.26

In one recent study, pomegranate juice treatment in men with rising PSA after surgery or radiotherapy resulted in a significant delay in PSA doubling time (the time it takes PSA levels to rise) from a mean of 15 months before treatment to 54 months following supplementation.14 Another study found more modest, but still significant delay in doubling time, from 11.9 months to 18.8 months.18

Animal studies demonstrate additional anti-cancer activity in pomegranates. In a specialized mouse model of prostate cancer, 100% of untreated mice developed palpable tumors within 20 weeks, compared to as low as 20% in the group treated with pomegranate extract; the treated animals lived for up to a median of 92 weeks, more than twice as long as the 43 weeks survived by untreated mice.20

These remarkable results are observed in part because naturally occurring pomegranate polyphenols are concentrated in prostate tissue, facilitating their protective effects.19 Once in the prostate, these polyphenols selectively inhibit cancer cell proliferation, leaving healthy prostate tissue relatively unaffected.9,17

This is a potential “epigenetic” effect: pomegranate polyphenols decrease the expression of proteins that cancer cells use to support their rapid rate of replication.11,15,16,21

Added prostate cancer-fighting benefits of pomegranate include reduction of the inflammation that drives cancer progression, suppression of new blood vessel growth within a forming prostate tumor, and increased expression of genes that keep cells clumped together normally, thereby inhibiting the invasive potential of prostate cancer.13,22-24
Turmeric

Turmeric’s unique contribution to the prostate-cancer-fighting pill is its extraordinary anti-inflammatory properties, provided chiefly by its natural primary component, curcumin. Reducing inflammation with curcumin reduces the metastases that ultimately kill prostate cancer patients. Curcumin also down-regulates genes involved in adhesion, motility, and invasiveness that prostate cancer cells need to invade and spread.

Curcumin specifically inhibits prostate cancer cell production of PSA by blocking its genetic expression. At the same time, it also reduces activation of the androgen receptors on cancer cells that trigger increased production of PSA.

But the whole turmeric root also contains important oils and other substances that enhance curcumin’s absorption and have health benefits of their own, including anti-cancer actions.

Turmeric’s components also inhibit cancer cell proliferation, restore cancer cells’ ability to die normally by apoptosis, and decrease the density of blood vessels needed for tumor expansion. By modulating cell signaling mechanisms, curcumin arrests the out-of-control cell replication cycle typical in cancer.

Curcumin also sensitizes cancer cells to chemotherapy and radiation therapy, as well as to the intrinsic “death factor” called TRAIL (TNF-related apoptosis-inducing ligand), one of the body’s natural cancer-suppressing mechanisms. Remarkably, these sensitizing effects are not found on normal, healthy cells, so they remain protected during treatment.

The compound has also been found to block growth factors and androgen receptors used by cancer cells to support themselves.

Broccoli

Broccoli’s unique contribution to the prostate-cancer-fighting pill is its ability to up-regulate phase II detoxifying enzymes in gut and liver tissue, enabling the body to render harmless thousands of potentially carcinogenic molecules in our diet. In addition, the naturally occurring sulfur-rich broccoli constituents sulforaphane, indole-3-carbinol (I3C), and others have now been identified as potent epigenetic regulators.

These broccoli compounds control enzymes called histone deacetylases (HDAC) that regulate the genes encoded in DNA—including those responsible for promoting or suppressing cancer formation. Known collectively as histone deacetylase (HDAC) inhibitors, such molecules are prime objectives of Big Pharma.

Men with high consumption of broccoli and other cruciferous vegetables have a 40% lower risk of invasive prostate cancer. And in animal studies, broccoli feeding reduced prostate tumor weight by 42% in prostate cancer-prone mice and suppressed growth of implanted human prostate cancer cells by 40%.

Broccoli compounds reduce PSA production as a result of slowing prostate cancer cell replication in laboratory cell culture models. They appear to inhibit expression of the androgen receptors that prostate cancer needs to survive.

Broccoli’s other prostate cancer-fighting properties include inhibition of growth and transcription factors that are activated in malignancies, restoration of normal tumor suppressor genes, and increased production of apoptosis-inducing proteins.
Summary

Prostate cancer is a paradox: Its typically slow growth rate makes it possible to treat if discovered early, but once it has metastasized, it is often lethal. The combination of four widely-recognized cancer-fighting foods, pomegranate, green tea, turmeric, and broccoli, in a single twice-daily pill has now been shown to significantly reduce the rate of rise of PSA, the tumor marker that indicates progression and invasion of prostate cancer.5

This new pill appears to work by providing cancer-suppressing actions at a wide variety of targets. All of this pill’s components have the capacity to cause favorable epigenetic changes, reversing the gene damage that leads to cancer development and restoring normal cancer suppression mechanisms.11,15,16,25,41,42,49,63,67-69

In a tightly controlled clinical trial, putting them together in a single pill was shown to be effective at slowing the growth of existing prostate cancers and preventing surgical and other side effect-prone procedures.

If you or someone you know suffers from prostate cancer, or is interested in preventing it, this new functional food pill, or its individual constituents, should be part of their daily program.

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


As people age, they become more susceptible to muscle deterioration and a declining immune system. Fortunately, whey protein can have a positive impact on muscle construction and immunity due to its branched-chain amino acid profile (BCAAs) and naturally occurring lactoferrin and immunoglobins.

Unlike many commercial brands on the market, New Zealand Whey Protein Concentrate is uniquely derived from grass-fed, free range cows living healthy lives in New Zealand and not treated with Growth Hormone (rBST).

Life Extension’s New Zealand Whey Protein Concentrate offers the following:

- Non-GMO Whey Protein Concentrate!
- Naturally high levels of essential branched-chain amino acids!
- High-quality muscle building protein!
- Easily mixes into water or milk!
- Great Taste! – Available in both natural chocolate and natural vanilla flavors.

The retail price for an 18.34 ounce container of New Zealand Vanilla Flavored Whey Protein Concentrate (Item # 01770) or for a 23.28 ounce container of New Zealand Chocolate Flavored Whey Protein Concentrate (Item # 01771) is $30. If a member purchases four bottles, the price is reduced to $19.95 per bottle. Contains milk.

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

References

*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.
When Life Extension® introduced standardized green tea extract in 1993, the supplement was very expensive. As more research was published about green tea’s multifaceted benefits, more companies competed to make higher-potency extracts at lower prices.

The good news for consumers is that they can obtain high-potency standardized green tea extract capsules at a fraction of the original price.

The Life Extension Foundation Buyers Club offers 98% green tea extracts in either a lightly caffeinated or decaffeinated form. These 98% extracts are standardized to provide high potencies of critical EGCG, the most important polyphenol found in green tea.

These highly concentrated Mega Green Tea Extract Caps contain 725 mg of either lightly caffeinated or decaffeinated 98% standardized green tea extracts. The retail price for 100 vegetarian capsules of Mega Green Tea Extract is $30.

If a member buys four bottles of 725 mg Mega Green Tea Extract capsules, the price is reduced to $21 per bottle. Most people take just one capsule daily.
A high percentage of men will endure some form of prostate-induced discomfort over the course of their lifetimes.¹

A placebo-controlled, double-blind trial presented September 2013 reported that a specific blend of pomegranate, green tea, turmeric, and broccoli—formulated together in a capsule called Pomi-T™—powerfully maintained healthy levels of prostate specific antigen (PSA).²

Life Extension now offers this same capsule for men who are serious about supporting and protecting their prostate as they age—by targeting PSA. The four foods in Pomi-T™ have healthful benefits for your entire body. But their constituent molecules, naturally present in food, have now been shown to concentrate within prostate tissue and provide a rich array of complementary, prostate-supporting, PSA-modulating mechanisms.³⁻⁹

**POMEGRANATE**
- Specifically concentrates in prostate tissue³
- Supports healthy apoptosis, your body's system of removing senescent cells when needed⁴⁻⁶
- Promotes healthy levels of inflammatory response, inhibits androgen receptor expression, and inhibits abnormal cell migration,⁷⁻⁸

**GREEN TEA**
- EGCG, a green tea catechin, specifically concentrates in prostate tissue where it regulates PSA (prostate specific antigen) production to maintain healthy PSA levels⁹,¹⁰
- Helps modulate genetic expression and activity of androgen receptors¹¹
- Supports body's natural defenses against oxidation.¹²

**TURMERIC**
- Promotes a healthy level of inflammatory response, chiefly due to its main component, curcumin¹³
- Helps modulate cell signaling mechanisms, inhibiting abnormal cell adhesion and migration.¹⁴
- Promotes healthy cell proliferation and apoptosis.¹⁵

**BROCCOLI**
- Helps regulate enzymes (phase II detoxifying enzymes) in gut and liver tissue that helps render harmful dietary molecules harmless¹⁶
- Helps promote healthy PSA levels¹⁷
- Supports regulation of cell growth and transcription factors and normal production of apoptosis-inducing proteins¹⁸,¹⁹

The novel and scientifically validated blend of food in Pomi-T™ represents the next generation of targeted support for the aging prostate!

The suggested daily dosage of two vegetarian capsules of Pomi-T™ provides:

- Pomi-T™ Super Foods Proprietary Blend 960 mg
  - Broccoli (florets and stalks) powder, Turmeric (root) powder, Pomegranate (whole fruit) powder, and Green Tea (leaf) extract 5:1

A bottle of 60 vegetarian capsules of Pomi-T™ retails for $33.33. Members of the Life Extension Foundation pay only $25 per bottle.

References
Impact of DIET on PROSTATE CANCER
Risk and Mortality

If the information you are about to read could be turned into a patented drug, it would be worth billions of dollars of annual sales to whoever owned it.

What’s regrettable is very few doctors provide this lifesaving data to their prostate cancer patients. A staggering number of lives could be spared if the dietary changes discussed in this article are widely implemented.

In the February 2007 issue of Life Extension magazine®, we published an article titled “Eating Your Way to Prostate Cancer.”

In the April 2003 issue, we published an article titled “Eating Food Cooked at High Temperature Accelerates Aging.”

Since these articles were published, large numbers of confirmative studies have been conducted that substantiate what we warned about.

This article will describe recently published science showing how eating the wrong foods markedly increase one’s risk of developing prostate cancer.

It also reveals data showing that men already diagnosed with prostate cancer who consume the wrong foods progress to advanced disease and death faster. >
Cancer cells are present in the prostate glands of many aging men, yet only one in six men are ever diagnosed with prostate cancer.\textsuperscript{1,2} If one looks at what is required for a single cancer cell to develop into a detectable tumor, it becomes obvious that natural barriers exist to protect men against full-blown cancer.

Unfortunately, dietary choices in the Western world circumvent the body’s protective barriers.\textsuperscript{3} The end result is that most men unwittingly provide, through their food choices, biological fuel for existing prostate cancer cells to propagate and metastasize.
An understanding of the biological roles of diet and specific nutrients can enable aging men to achieve a considerable amount of control over whether isolated cancer cells in their prostate gland will ever show up as a clinically diagnosed disease.

The impact of the food we ingest on cell growth and death is so pronounced that it can be similar to the effects displayed by anticancer drugs—without the toxicities.

**Don’t Eat Overcooked Meat**

Any meat (including fish) cooked at high temperatures creates dangerous carcinogens.4 Scientists looked at men whose diets included high intake of red meat cooked at high temperatures, pan-fried, or well-done. Their findings published in 2012 showed specific gene expression changes that predisposed these men to advanced prostate cancer.5 These kinds of studies show that one can exert a degree of control over their cell regulatory genes by avoiding overcooked meats.

Aggressive malignancies are those that rapidly propagate, infiltrate and metastasize.6 A 2011 study evaluated almost 1,000 men and found that higher consumption of any ground beef or processed meats was associated with an increased risk of aggressive prostate cancer.7 Men who ate ground beef showed the strongest association with a 130% increased incidence. The association primarily reflected intake of grilled or barbequed meat, with more well-done meat conferring a higher risk of aggressive prostate cancer. In contrast, consumption of rare/medium cooked ground beef was not associated with aggressive prostate cancer.7

A 2011 study looked at dietary patterns of 726 newly diagnosed prostate cancer cases and compared them to 527 controls.8 For advanced prostate cancer (but not localized disease), there was an associated 79% increased risk in men who ate hamburgers, a 57% increased risk with processed meats, a 63% increased risk with grilled red meat, and a 52% increased risk with well-done red meat.8 This study corroborated others associating consumption of processed meat and red meat, especially when cooked at high temperatures, with increased cases of advanced prostate cancer.5,6
Concern About Eggs and Milk

Large-scale studies associate egg consumption with sharply increased cancer risks.9,10

A 2011 study looked at 27,607 men who developed or died from prostate cancer over a 14-year period.9 Men who consumed 2.5 or more eggs per week had an 81% increased risk of lethal prostate cancer compared to those who consumed less than half an egg per week.9 This study showed that consumption of eggs increased the risk of healthy men developing metastatic prostate cancer.

A 2013 evaluation was done using data from the famous Physician's Health Study to identify the impact of consumption of skim or whole milk on incidence and survival after diagnosis of prostate cancer.11 This analysis involved 21,660 physicians who were followed for 28 years. Skim/low fat milk was associated with increased risk of low grade prostate cancer, whereas whole milk was associated with increased risk of fatal prostate cancers. In these men diagnosed with prostate cancer, consumption of whole milk was associated with a 117% increased risk of progression to fatal disease.11 This finding further substantiates the important role of diet even after prostate cancer is diagnosed.

The take-home lesson so far is if one has an elevated or rising PSA, it is especially prudent to avoid over cooked red meats, processed meat, eggs, and whole cow’s milk.

Confusion About Omega-6 Fats

Omega-6 fats are essential to life. We are unable to make them in our body and must get them from foods.12

The problem is that Western diets have become so overloaded with omega-6s that our bodies have become poisoned with them. The typical American tends to consume up to 25 times more omega-6 fats than the healthier omega-3 fats.12

One reason we have become so overloaded with omega-6s is that in the rush to switch from red meat and other saturated fats such as lard, we have been gobbling down too many omega-6-rich foods. These include vegetable oils used in all kinds of processed and fried foods, margarine, salad dressing, mayonnaise, certain nuts, peanut butter, and even poultry, a meat with high omega-6 content.13

Commercial food companies deceivingly promote polyunsaturated vegetable oils like corn and safflower as healthy because of early studies showing reduced cardiovascular risk factors in those who consumed vegetable oils compared to animal-based fats such as butter.14

What You Need to Know

Prostate Cancer:
Food For Thought

- Dietary choices in the Western world circumvent the body's protective barriers to cancer.
- Men who regularly consume certain plant foods have sharply lower rates of prostate cancer.
- High intakes of red meat cooked at high temperatures can result in specific gene expression changes that may predispose men to advanced prostate cancer.
- Large-scale studies associate egg consumption with sharply increased cancer risks.
- Skim/low fat milk was associated with increased risk of low grade prostate cancer, whereas whole milk was associated with increased risk of high-grade prostate cancers.
- Diets high in omega-6 fats and saturated fats are associated with greater prostate cancer risk, whereas increased intake of the type of omega-3 fats found in fish has been shown to confer protection.
- Arachidonic acid, found abundantly in eggs and chicken, is metabolized by the 5-LOX enzyme to 5-hydroxyeicosatetraenoic acid (5-HETE), a potent survival factor that prostate cancer cells use to escape destruction.
- Not only do 5-LOX products directly stimulate cancer cell propagation, but the breakdown products that 5-LOX produces from arachidonic acid (such as leukotriene B4, 5-HETE, and hydroxylated fatty acids) cause tissue destruction, chronic inflammation, and increased resistance of tumor cells to apoptosis (programmed cell destruction).
Role of Omega-6 Fats in Prostate Cancer

Diets high in omega-6 fats and saturated fats are associated with greater prostate cancer risk, whereas increased intake of the type of omega-3 fats found in fish has been shown to confer protection.15-17

Based on consistent epidemiological findings across a wide range of human populations, scientists have sought to understand why eating the wrong kinds of fat (saturated and omega-6 fats) provokes a stimulatory effect on prostate cancer.15,17

To ascertain what happens after we eat bad fats, all one has to do is look at the metabolic breakdown pathways that these fats follow in the body, as shown in the chart on the next page (Figure 1). For example, let us assume that for dinner, you eat a steak (a source of saturated fat), potato (a high-glycemic starch) and a salad with a typical dressing of soybean and/or safflower oils (omega-6 fats).

As can be seen in the flow chart, omega-6 fats can convert to arachidonic acid in the body. Meat itself contains arachidonic acid.18 One way that the body rids itself of excess arachidonic acid is by provoking a dangerous metabolizing pathway through 5-lipoxygenase (5-LOX).

It is well established that 5-LOX products stimulate prostate cancer cell proliferation via several well-defined mechanisms.19-21 High glycemic foods also promote formation of 5-LOX in the body, via activation of enzymes involved in the formation of arachidonic acid.18

Arachidonic acid, found abundantly in eggs and chicken, is metabolized by the 5-LOX enzyme to 5-hydroxyeicosatetraeonic acid (5-HETE), a potent survival factor that prostate cancer cells use to escape destruction.18,22,23

The flow chart (Figure 1) clearly demonstrates how consuming a diet rich in arachidonic acid provokes the production of dangerous 5-LOX products, which can promote prostate cancer progression.19-23 In addition to 5-HETE, 5-LOX also metabolizes arachidonic acid to leukotriene B4 and other pro-inflammatory agents that promote cancer.24

The chart (Table 1) on this page provides a long list of foods that are high in arachidonic acid. Just because a food is listed on this chart does not mean you have to avoid it. It is wise, however, to pick which high-arachidonic acid foods are that important compared to ones you may not even realize you’re consuming.
Figure 1: How Common Foods Convert to Deadly Compounds in the Body

Flow chart showing how the body metabolizes common foods via the 5-lipoxygenase (5-LOX) pathway.

**Consumption of arachidonic acid-rich foods such as egg yolk, red meat, poultry, and organ meat.**

**Consumption of arachidonic acid precursors/stimulating foods such as omega-6 fats and high-glycemic carbohydrates.**

- **EXCESS ARACHIDONIC ACID IN THE BODY**
  - Increased production of **5-lipoxygenase (5-LOX)** (facilitates the propagation, infiltration, and metastasis of cancer cells)
  - Increased production of **5-hydroxyeicosatetraenoic acid (5-HETE)** (interferes with programmed cancer cell death [apoptosis])
  - Excess accumulation of **leukotriene B4** (proinflammatory compound that attacks the joints, arterial wall, and other tissues)
5-LOX Is Over-Expressed in Prostate Cancer

Based on studies showing that consumption of foods rich in omega 6 fatty acids is associated with higher incidences of prostate cancer, scientists sought to determine how much of the 5-LOX enzyme is present in malignant versus benign prostate tissues.²⁵

Using biopsy samples taken from living human patients, the researchers found that 5-LOX mRNA levels were an astounding six-fold greater in malignant prostate tissues compared with benign tissues. This study also found that levels of 5-HETE were 2.2-fold greater in malignant versus benign prostate tissues.²⁶ The scientists concluded this study by stating that selective inhibitors of 5-LOX may be useful in the prevention or treatment of patients with prostate cancer.²⁶

5-LOX Promotes Tumor Growth Factors

As the evidence mounts that ingesting “bad fats” increases prostate cancer risk, scientists are evaluating the effects of 5-LOX on various growth factors involved in the progression, angiogenesis, and metastasis of cancer cells.

One study found that 5-LOX activity is required to stimulate prostate cancer cell growth by epidermal growth factor (EGF) and other tumor cell proliferating factors produced in the body.¹⁹ When 5-LOX levels were reduced, the cancer cell stimulatory effect of EGF and other growth factors was diminished.¹⁹

In a mouse study, an increase in 5-LOX resulted in a corresponding increase in vascular endothelial growth factor (VEGF), a key growth factor that tumor cells use to stimulate new blood vessel formation (angiogenesis) into the tumor. 5-LOX inhibitors have been shown to reduce tumor angiogenesis along with a host of other growth factors.²⁷

In both androgen-dependent and androgen-independent human prostate cancer cell lines, the inhibition of 5-LOX has consistently been shown to halt the growth stimulatory action of 5-LOX and prompt rapid and massive apoptosis (cancer cell destruction).²⁰,²²,²⁸,²⁹

Omega-3 Fatty Acids: A First Line of Defense

One reason that fish oil supplements have become so popular is that their beneficial EPA/DHA fatty acids can help reduce the production of arachidonic acid-derived tumor promoting byproducts in the body.³⁰-³³

As shown on the flow chart below (Figure 2), if arachidonic acid levels are reduced, there would be a corresponding suppression of 5-LOX and its metabolic byproducts 5-HETE and leukotriene B₄.
Once one understands the lethal 5-LOX cascades, it is easy to see why people who excessively consume foods rich in arachidonic acid, and those who fail to reduce the production of arachidonic acid metabolites (such as 5-HETE) by ensuring adequate intake of omega-3 fatty acids, are setting themselves up for prostate cancer and a host of inflammatory disorders (including atherosclerosis).

**Nutrients That Suppress 5-LOX**

Health-conscious people already take nutrients like curcumin and fish oil that help to lower 5-LOX activity in the body. Studies show that lycopene and saw palmetto extract also help to suppress 5-LOX.36,37 The suppression of 5-LOX by these nutrients may partially account for their favorable effects on the prostate gland.

As humans age, however, chronic inflammatory processes can cause the over-expression of 5-LOX in the body.38 For maturing males, the result of excess 5-LOX may be the epidemic of prostate cancer observed as men age.2

Based on the cumulative knowledge that 5-LOX itself and its metabolic products can promote the progression and metastasis of prostate cancer cells, it would appear advantageous to take aggressive steps to suppress this lethal enzyme.36

This can be done by avoiding foods that promote 5-LOX formation in the body and taking supplements that inhibit 5-LOX via differing pathways.

**Research Substantiating Boswellia**

Specific extracts from the boswellia plant selectively inhibit 5-lipoxygenase (5-LOX) a potent inducer of inflammation and carcinogenic byproducts.39,40

Boswellia extracts have been used for centuries, particularly in India as anti-inflammatory agents.41 In several well-controlled human studies, boswellia has been shown to be effective in alleviating various chronic inflammatory disorders.42-46

Scientists have discovered that the specific constituent in boswellia responsible for suppressing 5-LOX is AKBA (3-O-acetyl-11-keto-B-boswellic acid).41 Boswellia-derived AKBA binds directly to 5-LOX and inhibits its activity.41 Other boswellic acids only partially and incompletely inhibit 5-LOX.41,47

Formulas containing high concentrations of AKBA from boswellia have been developed based on its ability to treat inflammatory disorders. Standardized boswellia extracts have long been included in prostate support nutrient formulas for the purpose of suppressing excess 5-LOX.

**MULTIPLE DANGERS OF EXCESS ARACHIDONIC ACID**

In response to arachidonic acid overload, the body increases its production of enzymes like 5-lipoxygenase (5-LOX) to degrade arachidonic acid.48 Not only do 5-LOX products directly stimulate cancer cells propagation, but the breakdown products that 5-LOX produces from arachidonic acid (such as leukotriene B4, 5-HETE, and hydroxylated fatty acids) cause tissue destruction, chronic inflammation, and increased resistance of tumor cells to apoptosis (programmed cell destruction).19-21,48-58

It is important to understand that 5-LOX is not the only dangerous enzyme the body produces to break down arachidonic acid. As can be seen in the chart on the previous page, both cyclooxygenase-1 and cyclooxygenase-2 (COX-1 and COX-2) also participate in the degradation of arachidonic acid.

COX-1 causes production of thromboxane A2, which can promote abnormal arterial blood clotting (thrombosis), resulting in heart attack and stroke.59-63 Thromboxane A2 is also involved in tumor metastasis.64,65 COX-2 is directly involved in cancer cell propagation, while its breakdown product (prostaglandin E2) promotes chronic inflammation.56,66-68 Most health-conscious people already inhibit the COX-1 and COX-2 enzymes by taking low-dose aspirin, curcumin, green tea, and various plant flavonoids such as pomegranate.61,69-82

A more integrative approach to this problem, however, would be to also reduce dietary levels of arachidonic acid, which is the precursor of 5-HETE and leukotriene B4.83
Prostate-Protecting Properties of Boswellia

Tumor necrosis factor-alpha (TNF-alpha) is a pro-inflammatory cytokine that often increases in aging people.84

From the standpoint of keeping prostate cancer cells in check, boswellia has been shown to prevent the TNF-alpha-induced expression of a protein-degrading enzyme called matrix metalloproteinase (MMP).85 Cancer cells use the MMP enzyme to tear apart natural barriers in the body that would normally encase them.86 Prostate cancer cells are notorious for inducing the production of this enzyme (TNF-alpha) that causes containment structures within the prostate gland to vanish, thus enabling the cancerous prostate cells to break through healthy prostate tissue and eventually metastasize.87,88

Prostate cancer cells use adhesion molecules (known as VCAM-1 and ICAM-1) to facilitate their spread throughout the body. Boswellia has been shown to prevent the up-regulation of these adhesion molecules, which are directly involved in inflammatory processes.85 Chronic inflammation is tightly linked to the induction of aberrant angiogenesis used by cancer cells to facilitate the growth of new blood vessels (angiogenesis) into tumors.89

The potent 5-LOX-inhibiting properties of boswellia, and its ability to suppress other inflammatory factors such as TNF-alpha, make it an important nutrient for those concerned with prostate cancer.41,85


Tea, Soy, Lignans, and Cruciferous Vegetables

Men who regularly consume certain plant foods have sharply lower rates of prostate cancer.90 Studies show that cauliflower, broccoli, flax lignans, and soy isoflavones protect against a host of diseases, including prostate cancer.91-99

A 2013 study reported that soy food consumption, more popular in Asian populations, is associated with a 25 to 30% reduced risk of prostate cancer.100 There is a lot of confusion about soy in the alternative health community. Everyone agrees that limiting intake of soybean oil is important because it is loaded with omega-6 fats.13 Other constituents found in soy, however, such as genistein and daidzein have demonstrated anti-prostate cancer mechanisms.101-107

Polyphenols found in green tea decrease serum levels of PSA, hepatocyte growth factor, and vascular endothelial growth factor (VEGF) in prostate cancer patients.108-113

The FDA says, however, that there is insufficient evidence to claim that green tea consumption protects against prostate cancer.114 Life Extension issued a rebuttal to the FDA position on green tea and prostate cancer in the November 2005 edition of Life Extension magazine®.

Urgent Need to Alter Dietary Patterns

Those consuming Western diets predispose themselves to cancer.1 It is encouraging that we know what food groups increase prostate cancer risk and what foods/nutrients reduce it.

All aging men should shift their diet towards foods that protect against prostate cancer. Those with rising or elevated PSA should be especially diligent in avoiding dietary factors that can fuel the growth of prostate tumors.115

The lethal impact of cancer-promoting foods may be mitigated by taking supplements such as green tea, curcumin, fish oil, pomegranate, and boswellia, along with regular inclusion of cruciferous vegetables and other healthy foods in one’s diet. ●

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


Each pack contains the following supplements:

- Two-Per-Day Multi-Nutrient Tablets (2 tablets)
- Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract (2 softgels, yielding 700 mg EPA and 500 mg DHA)
- Super Bio-Curcumin® (1 capsule provides 400 mg of Bio-Curcumin® that can provide blood levels equal to 2,500–2,800 mg of commercial curcumin supplements)
- Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support (1-100 mg softgel)
- Super Booster Softgels with Advanced K2 Complex (1 softgel)

The Best Way to Manage Your Daily Supplement Regimen

These vital nutrients, bundled at no extra cost into a single packet, combine convenience with superior value when compared to buying each product separately.

A box containing a 30-day supply of Comprehensive Nutrient Packs Advanced retails for $90. If a member buys four boxes, the cost is just $61.50 per box. Item# 01796

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Contains soybeans. Due to the source of kelp, this product may contain fish and shellfish.

To order Life Extension® Comprehensive Nutrient Packs Advanced, 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.
Another Breakthrough in Antioxidant Defense!

In 2008, Life Extension® introduced Berry Complete, a unique, high-potency blend of extracts from Nature’s most powerful free radical fighters.¹⁻⁵ The antioxidant strength of just one capsule equaled more than 50% of the recommended five daily servings of fruits and vegetables.

We then introduced an even more powerful antioxidant formula. A single capsule of the Enhanced Berry Complete with Açaí delivers an antioxidant value equivalent to more than 100% of the recommended daily fruit and vegetable intake.

ORAC: A Measure of Antioxidant Power

To measure the antioxidant strength of various foods, scientists use what is known as the ORAC index. While berries score higher than most fruits and vegetables, açaí boasts one of the highest ORAC values known to modern science.

Unfortunately, most commercial products containing açaí do not reflect the full nutritional content of the fruit. Only a fraction of its phenolic content survives industrial processing, handling, and storage.

Why should this matter to you? It’s more than a matter of antioxidant potency. In 2010, a team of researchers reported for the first time that açaí, blueberry, and strawberry polyphenols may provide targeted support for cellular metabolic processes that promote neural and cognitive health in the aging brain.⁶ But you need the complete polyphenolic profile to get the benefit.

Enhanced Berry Complete with Açaí gives you a convenient way to obtain a broad spectrum of seasonal, hard-to-find, highly perishable foods, for optimal antioxidant value.

A bottle containing 60 vegetarian capsules of Enhanced Berry Complete with Açaí retails for $29. If a member buys four bottles, the cost is just $19.50 per bottle. contains soybeans.

To order Enhanced Berry Complete with Açaí, call 1-800-544-4440 or visit www.LifeExtension.com

References

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.
Serotonin is a neurotransmitter made in the brain from tryptophan. Serotonin has been associated with positive moods and restful sleep.\textsuperscript{1,4}

To produce and maintain optimum serotonin levels, your body requires tryptophan, an essential amino acid, which means that your body cannot produce it.\textsuperscript{1}

In the body, tryptophan has been shown to:

- Improve sleep\textsuperscript{3,4}
- Enhance mood\textsuperscript{1,2,4}
- Modulate stress\textsuperscript{5}

Life Extension\textsuperscript{®} offers Optimized Tryptophan Plus to broadly and powerfully support tryptophan levels already within the normal range.

In addition to delivering an optimum intake of tryptophan itself—the Optimized Tryptophan Plus formula also provides a unique, balanced supply of other nutrients found to help maintain tryptophan activity in the body.\textsuperscript{6,8}

Multi-Pathway Tryptophan Support

The Optimized Tryptophan Plus blends lysine, niacinamide, and extracts of hops and rosemary to provide nutritive support for the body’s production of serotonin.

Purity and Safety

Life Extension\textsuperscript{®} Optimized Tryptophan Plus contains premium L-tryptophan which has undergone significantly more rigorous manufacturing processes than regular tryptophan material to assure the highest purity and safety.

The suggested daily dose of 3 vegetarian capsules of Optimized Tryptophan Plus provides:

- L-Tryptophan \textsuperscript{1} 1,000 mg
- L-Lysine (as L-Lysine HCl) \textsuperscript{2} 250 mg
- Proprietary Tryptophan Plus Blend \textsuperscript{3} 285 mg
  - Perluxan\textsuperscript{®} Hops Standardized Extract (Humulus lupulus) (cones), and Ursole\textsuperscript{™} Rosemary Standardized Extract (Rosmarinus officinalis) (leaves)
- Niacin (as Niacinamide) \textsuperscript{4} 66 mg

A bottle of 90 vegetarian capsules of Optimized Tryptophan Plus retails for $32. If a member buys four bottles, the price is reduced to $21.75 per bottle.

References


Perluxan\textsuperscript{®} is used by permission. Ursole\textsuperscript{™} is a trademark of Vitiva d. d., Slovenia.

For those who prefer capsules containing pure Tryptophan alone, Life Extension\textsuperscript{®} also offers L-Tryptophan.

Each capsule provides 500 milligrams of L-Tryptophan.

A bottle of 90 vegetarian capsules of L-Tryptophan retails for $33. If a member buys four bottles, the price is reduced to $22.50 per bottle.
Occasional constipation is one of the most frequent gastrointestinal complaints in the United States, particularly among women and the elderly.¹ To address this issue, Life Extension® offers a dose-adjustable nutritional solution—Effervescent Vitamin C-Magnesium Crystals—to provide immediate relief from occasional constipation.

THE PROBLEM
A series of rhythmic muscle contractions move food through the digestive tract.² But highly processed foods and a lack of quality nutrition can occasionally result in normal but temporarily ineffective movement of waste through the colon.

NUTRITIONAL SUPPORT
Vitamin C is an antioxidant that scavenges free radicals in the body and protects tissues from oxidative stress.³,⁴ Vitamin C is a vital cofactor to the formation of collagen, the connective tissue that supports arterial walls, skin, bones, and teeth.⁵,⁶
Magnesium is a cofactor in hundreds of enzymatic processes within cells, helps maintain healthy blood pressure levels already within normal range, improves the metabolic profile, beneficially impacts insulin resistance and inflammation. Research shows many Americans do not obtain adequate magnesium in their diets.⁷-¹¹

Effervescent Vitamin C-Magnesium Crystals has been developed to help provide relief from occasional constipation.

Effervescent Vitamin C-Magnesium Crystals can be used in varying doses depending on individual need. The suggested starting dose should be one (1) level teaspoon of Effervescent Vitamin C-Magnesium Crystals, taken on an empty stomach, mixed in 8 ounces of water. Follow immediately with drinking 8 additional ounces of water.

Each level teaspoon (approx 6 grams) provides:
- 4,500 milligrams of vitamin C (as ascorbic acid)
- 4 milligrams of vitamin B6 (as pyridoxine hydrochloride) and
- 250 milligrams of magnesium (as magnesium carbonate)

Some people will need to take one teaspoon of Effervescent Vitamin C-Magnesium Crystals on an empty stomach up to three times a week. Always follow by drinking an additional 8 ounces of water.

A bottle of 180 grams of Life Extension® Effervescent Vitamin C-Magnesium Crystals retails for $20. If a member buys four bottles, the price is reduced to only $13.50 per bottle.

References
1. Available at: http://digestive.niddk.nih.gov/diseases/pubs/constipation/.
12. Available at: http://www.ewg.org/skindeep/ingredient/704983/POLYETHYLENE_GLYCOL/.
Critical Importance of Mitochondria

In 1983, Life Extension® was the first to introduce CoQ10 as a proven method to enhance mitochondrial energy production.

CoQ10 has since gained universal recognition for its role in supporting cellular performance throughout the body.¹⁶

In an unprecedented breakthrough, a compound called PQQ (pyrroloquinoline quinone) has been shown to support mitochondrial biogenesis—the spontaneous generation of new mitochondria in aging cells.⁷ PQQ is available as a low-cost dietary supplement.

Mitochondria are cellular energy generators that supply virtually all the power your body requires for a healthy life span. An abundance of published studies underscores the critical importance of the mitochondria to overall health, especially as we age.¹⁸-⁵⁴ Energy-intensive organs like the heart and brain are dense with mitochondria.

Until recently, the only natural ways for aging individuals to increase the number of mitochondria in their bodies were long-term calorie restriction or exhaustive physical activity—which are difficult or impractical for most people to implement.

PQQ offers a viable alternative.
The Ultimate Cell Rejuvenator

The enormous amount of energy generated within the mitochondria exposes them to constant free radical attack. The resulting mitochondrial decay is a hallmark of aging.

PQQ protects and augments delicate mitochondrial structures to promote youthful cellular function in three distinct ways:

- **Antioxidant power.** Like CoQ10, PQQ is a highly potent antioxidant. Its extraordinary molecular stability enables it to facilitate thousands of biochemical reactions in the mitochondria, without breaking down, for maximum antioxidant and bioenergetic support.\(^5\)

- **Favorably modulates gene expression.** PQQ activates genes that promote formation of new mitochondria\(^7\)—and beneficially interacts with genes directly involved in mitochondrial health. These same genes also support healthy body weight, normal fat and sugar metabolism, and youthful cellular proliferation.\(^6\)

- **Mitochondrial defense.** Mitochondria possess their own DNA, distinct from the DNA contained in the nucleus. Unfortunately, compared to nuclear DNA, mitochondrial DNA is relatively unprotected. PQQ’s antioxidant potency and favorable gene expression profile act to support mitochondrial defense.

Vital Protection for the Aging Heart and Brain

PQQ is an essential nutrient, meaning your body cannot make it on its own. A growing body of research indicates that PQQ’s unique nutritional profile supports heart health and cognitive function—alone and in combination with CoQ10.\(^17,18\) This comes as no surprise, given how much energy these vital organs need.

Research shows that PQQ supports heart cell function in the presence of free radicals and promotes blood flow in heart muscle.\(^19\)

When taken in combination with CoQ10, just 20 mg per day of PQQ has been shown to promote memory, attention, and cognition in maturing individuals.\(^20\)

A Breakthrough Weapon in the Battle Against Aging

*Life Extension*\(^*\) has identified a purified, highly potent form of PQQ from Japan that is produced through a unique fermentation process. The result is the highest quality PQQ available on the market today called BioPQQ\(^\circledR\).

A bottle containing 30 20 mg vegetarian capsules of PQQ Caps with BioPQQ\(^\circledR\) retails for $40. If a member buys four bottles, the price is reduced to $27 per bottle.

The recommended daily dose for PQQ is 20 mg. Those taking Mitochondrial Energy Optimizer or Mitochondria Basics only require an additional 10 mg of PQQ since these formulas already provide 10 mg of PQQ. The retail price for 30 10 mg PQQ caps is $24. If a member buys four bottles, the price is reduced to only $16.50 per bottle. (Item #01500)

BioPQQ\(^\circledR\) is a registered trademark of MGC (Japan).

To order PQQ Caps with BioPQQ\(^\circledR\) standalone or any other PQQ-containing formula call 1-800-544-4440 or visit www.LifeExtension.com

References

Elevated levels of dihydrotestosterone (DHT) contribute to benign prostate enlargement.\(^1\)

Based on evidence that DHT is also involved in prostate cancer,\(^2\) two large studies were conducted in aging men to see if drugs that reduce DHT also lower prostate cancer risk.\(^3-5\)

One study evaluated the drug Avodart\(^\circledR\) (dutasteride) and the other Proscar\(^\circledR\) (finasteride).\(^3,4\) Both of these drugs inhibit the 5-alpha reductase enzyme, thus blocking the conversion of testosterone to much more powerful DHT.\(^5\)

Findings from the two studies showed both drugs reduce prostate cancer risk by about 23-25\%.\(^3,4\) These drugs also substantially reduce symptoms of benign prostate hyperplasia.\(^1,5\)

Some doctors, however, were concerned that in men who did develop prostate cancer, more in the group taking either of these drugs (Avodart\(^\circledR\) or Proscar\(^\circledR\)) developed high-grade prostate cancer.\(^3,4\) This is a justified concern. High-grade prostate cancer requires aggressive therapeutic intervention and is more challenging to cure.\(^6\)

This article will reveal overlooked findings showing that Avodart\(^\circledR\) or Proscar\(^\circledR\) do not increase high-grade prostate cancer risk and may reduce it. >
When prostate cancer is suspected, the typical diagnostic procedure is a **needle biopsy** of the prostate gland. The biopsied specimen is sent to a pathologist to determine the “grade” of any suspicious structures observed from the biopsied specimen.

The “grade” is determined by the “**Gleason**” scoring system. It is based on microscopic tumor patterns assessed by a pathologist while interpreting the biopsied specimen. The Gleason “grade” is a fundamental determinate used today to estimate low-grade, intermediate-grade, or high-grade malignancy.
As it relates to men taking drugs that dramatically collapse the size of the prostate gland (like Proscar® and Avodart®), pathologists have noted that a consequence may be to induce lower-grade cancer to resemble higher-grade cancer.4,13,14 They have stated that in men taking drugs like Avodart® or Proscar®, there would be a "grading bias" in which Gleason scores would indicate a worse grade tumor than really exists.

Proscar® Study Subjects Had Lower Rates of High-Grade Tumors

In the study evaluating Proscar® over a 7-year period, there was a 25% reduction in the risk of prostate cancer, but with an apparent increase in the risk of high-grade disease (as measured by Gleason scores).15

A further analysis of the data, however, revealed the contrary. When examining tissue taken from men who underwent radical prostatectomy (complete removal of prostate gland), there was a 27% reduction in high-grade disease in the Proscar® group as measured by Gleason scoring.15 It turned out that there was a biopsy-sensitivity issue in the Proscar® group that resulted in high-grade Gleason scores being assigned to some men that were really low-grade.15

The startling finding that Proscar® (finasteride) may reduce high-grade prostate cancer was revealed in a study titled "Finasteride Does Not Increase the Risk of High-Grade Prostate Cancer: A Bias-Adjusted Modeling Report."15 This study was published in the journal Cancer Prevention Research, but has been largely overlooked by the media, the FDA, and many physicians.

Shrinking Prostate Gland Makes High-Grade Cancer Easier To Detect

The impact of Avodart® or Proscar® on the size (volume) of the prostate gland is profound. Either drug reduces prostate gland volume by 17-25% over a relatively brief period of time.4,14

Avodart® or Proscar® has been shown to reduce PSA more significantly in the presence of no cancer or low-grade prostate cancer.16-18 This effect can better enable physicians to identify cases of suspicious high-grade disease, since PSA levels don’t drop as low or stay as low in the presence of high-grade prostate cancer.18,19

By reducing the size of the prostate gland, drugs like Avodart® or Proscar® can improve sensitivity of...
prostate biopsy and digital rectal exam.\textsuperscript{15} To understand this concept, understand that there were a minimum of 6-core biopsies done in the Proscar\textsuperscript{®} study and 10-core biopsies for the Avodart\textsuperscript{®} trial.\textsuperscript{4,15} These fine needle biopsies only remove a small percentage of tissue from a prostate gland. The larger the size of a prostate gland, the easier it is to miss malignant regions.

By reducing the bulk of the prostate gland, it was far easier to “hit” malignancies with a needle biopsy in men taking Avodart\textsuperscript{®} or Proscar\textsuperscript{®} compared to biopsies performed on the larger glands of those taking placebo.\textsuperscript{4,15}

Needle biopsies of the prostate gland are only about 75\% accurate to begin with.\textsuperscript{20} So it may be easy to understand why needle biopsies uncovered more high-grade tumors in men taking Avodart\textsuperscript{®} or Proscar\textsuperscript{®} compared to the placebo arm.

### How Much Did Prostate Glands Shrink?

As noted, the median prostate volume in men taking finasteride was 25\% lower compared to the placebo group, which represents a huge relative reduction in bulky prostate tissues.\textsuperscript{21}

A group of scientists calculated prostate gland volume differences along with other variables that were omitted when compiling the initial report on finasteride. When adjusting for all the variables, these scientists demonstrated a 45\% lower risk of prostate cancer in the finasteride group.\textsuperscript{21} The scientists noted that, “\textit{Adjustment for gland volume and number of cores biopsied (i.e., sampling density) eliminated the differences in high-grade cancer between the two arms.}”\textsuperscript{21}

### Prostate Biopsies: Size Matters

- Elevated levels of dihydrotestosterone (DHT) are involved in prostate cancer and contribute to benign prostate enlargement.
- In separate studies evaluating the prostate cancer protective benefit of Proscar\textsuperscript{®} and Avodart\textsuperscript{®}, medications to reduce DHT levels, there was a 22-25\% reduction in the risk of prostate cancer, but with an apparent increase in the risk of high-grade disease (as measured by Gleason scores).
- Avodart\textsuperscript{®} or Proscar\textsuperscript{®} have been shown to reduce prostate gland volume by 17-25\% over a relatively brief period of time.
- A review of several published reports attribute the higher Gleason scores observed in the groups taking Avodart\textsuperscript{®} or Proscar\textsuperscript{®} to the fact that it was easier to find high-grade cancers in the shrunken glands of men taking these drugs compared to the much larger glands of men in the placebo group.
- By reducing the size of the prostate gland, Avodart\textsuperscript{®} or Proscar\textsuperscript{®} can improve sensitivity of prostate biopsy and digital rectal exam.
Their published paper was titled: "Detection Bias Due to the Effect of Finasteride on Prostate Volume: A Modeling Approach for Analysis of the Prostate Cancer Prevention Trial." According to these scientists, when all co-variables were added in there was a trend toward 12% fewer high-grade prostate cancers amongst men taking finasteride.21

The conclusions from this analysis published in the Journal of the National Cancer Institute were:

"Although analyses using postrandomization data require cautious interpretation, these results suggest that sampling density bias alone could explain the excess of high-grade cancers among the finasteride-assigned participants in the PCPT."21

A review of several published reports attribute the higher Gleason scores observed in the groups taking the 5-alpha reductase inhibitors (Avodart® or Proscar®) to the fact that it was easier to find high-grade cancers in the shrunken glands of men taking these drugs compared to the much larger glands of men in the placebo group.22,23

The fact that there are published reports defending the safety of Proscar® and Avodart® does not mean the matter is settled.22-24 The debate may continue for years or decades. Aging men at risk for prostate cancer, however, do not have the luxury of waiting for uniform consensus.

Role of Estrogen

Estrogen is a cell growth promoter that has been implicated in the development of prostate cancer.25,26 Life Extension members have long been urged to keep estradiol (an estrogen) levels in the range of 18-30 pg/mL, yet many aging men present with estradiol levels around 40 pg/mL or higher, which markedly increase all-cause mortality.27

In a published analysis of the Proscar® study, scientists looked at levels of various sex hormones beyond just DHT. They found that men with the highest pretreatment concentrations of testosterone were associated with a 36% reduced rate of prostate cancer when taking Proscar®.28 These same scientists also noted

Conclusion of Independent Analysis of Proscar® (finasteride)

The researchers who conducted the analysis showing that Proscar® (finasteride) may reduce high-grade prostate cancer risk concluded their published paper by stating:

"Men must weigh the established benefits of a 25% reduction in prostate cancer (estimated to be 30% in the present analysis), decreased urinary symptoms, and decreased complications of an enlarged prostate against the established side effects, which include reduced sexual function. We found no evidence that finasteride increased the risk of high-grade prostate cancer in the PCPT. Therefore, we conclude that men 55 years or older have no need to be concerned about an increased risk of high-grade prostate cancer with finasteride."15
men with the highest level of estrone (an estrogen) had a 38% higher risk when taking Proscar®.28

This study supports the theory that when prostate cancer cells are deprived of a primary growth factor like DHT, they may readily adapt to utilizing estrogen to fuel propagation.28 The doctors who conducted this study concluded:

Further research is needed to evaluate whether “low post-treatment serum estrogens may identify men more likely to benefit from the use of finasteride to prevent prostate cancer.”28

Life Extension’s long-standing position has been for aging men to have their estrogen blood level tested and if it is elevated, initiate aromatase-inhibiting therapy to suppress estrogen to safe ranges. This may be of particular importance for men seeking to impede or reverse the course of prostate cancer. It also helps explain why some men taking Proscar® developed prostate cancer despite suppressing their DHT level.

The Proscar® (Finasteride) Studies

The Prostate Cancer Prevention Trial (PCPT) was a large-scale, long-term randomized, placebo-controlled study designed to evaluate if Proscar® (finasteride) could reduce risk of prostate cancer.14

Participants in this PCPT study were all aged 55 years or older and had baseline PSA levels less than or equal to 3 ng/mL. One group received 5 mg/day of finasteride and the other a placebo.1

This study was initiated based on multiple lines of evidence available in the early 1990s that suggested that treatment with finasteride (Proscar®) would reduce a man’s risk of developing prostate cancer. Finasteride functions to inhibit the 5-alpha-reductase enzyme, which then lowers dihydrotestosterone (DHT) levels.21

The plan was to evaluate the prevalence of prostate cancer in each group (finasteride and placebo) during the 7-year trial. About 15 months before the trial was scheduled to end, however, it was terminated because it had already met its primary objective.14

The PCPT study demonstrated a 24.8% reduction in the prevalence of prostate cancer with finasteride treatment. An unanticipated finding, however, was that cancers with a high-grade Gleason score of 7-10 were more common in men treated with finasteride (6.4%) than in men treated with placebo (5.1%).21

To put these percentages of high-grade Gleason scores into perspective, they suggest that if all 18,882 men who entered the trial were given the placebo, 963 of them would have been diagnosed with high-grade disease. If all 18,882 men had taken finasteride, 1,208 men would have been diagnosed with high-grade disease. The difference is 245 more men being diagnosed with high-grade disease based on this assumption.

Of these 18,882 men, however, 4,323 would have contracted any grade of prostate cancer if all were given placebo based upon the results of the study, whereas only 3,134 would have contracted any grade of prostate cancer if all were given finasteride.21 That’s a difference of 1,189 men who would have avoided prostate cancer altogether during the study trial period if they all took finasteride.

We at Life Extension are well aware that high-grade prostate cancer grows faster and is more likely to spread beyond the prostate gland.6 Depending on your long-term longevity objectives, however, the data showing 1,189 fewer men developing any form of prostate cancer compared to 245 more men being diagnosed with high-grade disease might favor the finasteride group. And as you’ve read already, it was much easier to detect prostate cancer in men taking finasteride, meaning that the drug itself should not be blamed for the higher rate of diagnosis.21

As we’ve shown, there appears to be no increase in high-grade disease in men taking finasteride, just higher rates of biopsy detection based on smaller size prostate volume, along with misinterpreted pathologies of biopsies that later showed 27% fewer high-grade cases in men taking finasteride based on examination of surgically-removed prostate glands.14
The higher number of high-grade Gleason scores in the Avodart® group can be attributed to the same factors identified in the finasteride (PCPT) study, such as higher rates of biopsy detection based on smaller prostate gland size in men taking Avodart®, along with biopsy bias based on collapsing prostate glands that may have made some tumors appear higher-grade than they really were.4

The FDA’s response, however, was to issue a label change for Avodart® and Proscar® to warn of the increased risk of being diagnosed with a higher-grade prostate cancer while taking these drugs.29 This warning provides little benefit to aging men who are routinely prescribed these drugs to treat benign prostate hyperplasia. It creates confusion as patients query their doctor as to why a drug that FDA says is potentially dangerous is being prescribed to them.

In 2012, the results of another study (Lancet) were released showing that Avodart® was effective in slowing the progression of low-grade prostate tumors in 38% of men undergoing active surveillance (watchful waiting).30 This study of 302 men diagnosed with low-grade prostate cancer used 12-core biopsies obtained at 1.5 and 3 years. This Lancet study showed there to be slightly fewer (14%) higher-grade tumors in the Avodart group compared to placebo (16%).30

A study published in May 2013 evaluated 82 men with very low-risk prostate cancer who underwent active surveillance (watchful waiting) and were treated with a 5-alpha reductase inhibitor drug over a 3-year period. The results demonstrated the safety of the drugs and noted that at the first re-staging biopsy, 54% of the subjects no longer had prostate cancer.31 This small study helps substantiate the value of Avodart® or Proscar® for low-risk prostate cancer patients, but is not relevant to those with high-grade tumors that often require aggressive treatment.
We Must Avoid A “Tomato Effect”

“The Tomato Effect” was first described in the *Journal of the American Medical Association* in 1984. It analogized how doctors historically have ignored or rejected efficacious treatments that did not fit with accepted theories of disease prevention/treatment at the time.

“The Tomato Effect” is named for a period from the 1600s to early 1800s in America where tomatoes were considered poisonous and therefore unsafe to eat. This fear persisted despite the fact that Americans knew Europeans were regularly eating tomatoes with no ill effects.

The perception of the tomato changed in 1820 when a man ate a tomato on the steps of a New Jersey courthouse to prove they are safe. Within a decade, Americans were regularly eating tomatoes that for over 200 years were considered poisonous.

In today’s world, we have an opposite problem that nonetheless can create a lethal “tomato effect” when it comes to rejecting lifesaving therapies. Physicians and patients are overloaded with information and lack the time to analyze data to accurately determine safety and efficacy.

Humans have a strong propensity to remember negative details. This human failing has caused many physicians and patients to reject 5-alpha reductase inhibitors because they recall something about more high-grade prostate tumors in men taking Proscar® or Avodart®. Never mind hard facts showing the opposite. People today want a succinct summary, a curb-side explanation, and not too many distracting details.

As we have repeatedly shown in this article, what appeared to be more high-grade tumors in two studies of Proscar® and Avodart® were apparently based on a mistaken interpretation of the data.

Sensitivity Analysis Supports Safety of 5-alpha Reductase Inhibitors

Another independent analysis of the prostate-gland shrinking effects of Proscar was conducted and published in the *Journal of the American Statistical Association*. In technical terms, this study is called a “sensitivity analysis,” which in lay language may be explained as allowing a reviewer to assess the impact that changes in certain parameters will have on a study’s conclusions. By way of example, here is one quote from this study:

**“Because finasteride shrinks the prostate volume, the 6-core biopsies covered a larger area of the prostate for cases in the finasteride arm and hence were probably more likely to detect high-grade prostate cancer than on the placebo arm.”**

To validate this statement, the researchers noted that the ability to detect high-grade prostate cancer in the placebo group was 21% lower than in the finasteride arm. The reason the researchers knew this is that biopsies of prostate glands surgically removed showed that slightly more men in the placebo arm had high-grade prostate cancer than those taking finasteride, yet the needle biopsies erroneously reflected the opposite. For those who enjoy seeing the math, here is how the researchers calculated this:

**“In the placebo group the sensitivity of biopsy for high-grade detection was 45% (55 biopsy high-grades / 123 prostatectomy high-grades), compared to 66% on finasteride (76 biopsy high-grades / 115 prostatectomy high-grades), suggesting a substantial downward bias in detecting high-grade cancer on placebo relative to finasteride.”**

The following chart helps explain the sensitivity analysis described in the preceding paragraph:

<table>
<thead>
<tr>
<th></th>
<th>Placebo</th>
<th>Finasteride</th>
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</thead>
<tbody>
<tr>
<td>Number of biopsy specimens detecting high-grade cancer</td>
<td>55</td>
<td>76</td>
</tr>
<tr>
<td>Number of surgery specimens detecting high-grade cancer</td>
<td>123</td>
<td>115</td>
</tr>
<tr>
<td>Percentage of high-grade cancers detected at biopsy</td>
<td>45%</td>
<td>66%</td>
</tr>
</tbody>
</table>

This chart shows finasteride improved detection of high-grade prostate tumors in biopsies, but there were not more high-grade tumors in men taking finasteride when surgical specimens were examined.
In the haste of today’s busy medical practices, we are concerned that huge numbers of men who could benefit enormously from 5-alpha reductase inhibitors will not be prescribed them. We hope Life Extension members appreciate the effort we have made to analyze the data so that they can make rational choices when confronted with real or potential low-grade prostate cancer.

**Worst Case Scenario: Assume We Are Wrong?**

We have provided solid evidence that Avodart® (dutasteride) or Proscar® (finasteride) do not increase high-grade prostate cancer risk. But what if we are wrong?

Here is what would happen under such circumstance using the Prostate Cancer Prevention Trial (PCPT) study for reference:

- More than 238,000 men will be diagnosed with prostate cancer in 2013.
- If all these men had taken Proscar®, about 57,120 of them (24%) would avoid it.
- Based upon the results of the PCPT study, if none of these men took Proscar®, 52,598 would have high-grade (Gleason score ≥ 7) disease as opposed to 65,840 who would be diagnosed with high-grade disease (assuming Proscar® somehow causes high-grade disease).
- So each year, 57,120 men would avoid prostate cancer altogether, but 8,720 more men would be diagnosed with high-grade disease (assuming Proscar® (or Avodart®) really cause it).
- Under this worst case scenario, one could argue there would be greater numbers of beneficial outcomes (as opposed to adverse ones) if all men took Proscar® (or Avodart®).

We at Life Extension® don’t recommend these drugs for all men. They appear effective for reducing risk of low-grade prostate cancer and helping to better diagnose high-grade prostate cancer by shrinking prostate gland volume and better enabling the PSA marker to identify high-grade malignancy.

Our opposition might state that most men over age 69 with low-grade prostate cancer don’t have to be concerned because they are likely to die of something else before their prostate cancer spreads to other parts of the body.

While this may be the case for typical men over age 69, it’s a far cry from the longevity objectives of Life Extension members. And low-grade prostate cancers do kill some men and are the most prevalent form of prostate cancer diagnosed.

With all due respect to Patrick Walsh, MD, who is advocating that urologists change the medical classification of low-grade prostate malignancy to remove the word “cancer” so as not to create psychological stress in aging men, and to avoid overly aggressive medical procedures, pretending low-grade malignancies are something else will not make them go away.

The documentation presented in this issue of Life Extension magazine® that low-grade prostate cancers may be reversible in some men using a variety of inexpensive drugs, nutrients and dietary changes mandates that aging men have annual PSA blood tests and other diagnostics needed to assess the health of their prostate gland. If high-grade disease is detected, it is curable in its early stages, whereas the more prevalent low-grade prostate cancers are often controllable or reversible without requiring side-effect-prone treatments.

**New 18-Year Study Confirms Benefits of Finasteride**

As we were finalizing this article, a new study was published in the New England Journal of Medicine that further verified the safety and efficacy of finasteride in the prevention of prostate cancer.

This study meticulously followed all the men in the original Prostate Cancer Prevention Trial for up to 18 years.

The findings showed that long-term prostate cancer risk was reduced by about 33% in men who had received finasteride compared to the placebo group. This approximate 33% reduction in prostate cancer incidence was greater than the original study findings that looked at these same men over a shorter (7-year) time period.
Of men who did develop prostate cancer, those in the finasteride group had a 17% greater chance of high-grade disease, yet long-term mortality data was virtually identical in both groups. This adds a tremendous weight of evidence as to the safety of finasteride since if it really caused an increase in high-grade disease, more men in the finasteride group would be expected to have died sooner.

In addition, the 17% greater chance of high-grade disease seen in this long-term follow up was far lower than the 25.5% seen in the early phase of the Prostate Cancer Prevention Trial. The authors of this new study emphasized that the reason that more men in the finasteride group were found with high-grade disease was “detection bias.” As we stated earlier, 5-alpha reductase inhibitor drugs like finasteride (Proscar®) and dutasteride (Avodart®), markedly shrink prostate gland volume, thus making detection of tumors much more efficient. Proscar® or Avodart® do not appear to cause high-grade tumors, they just make finding them much easier, which is of significant importance in obtaining curative treatment before these aggressive cancer cells escape from the confines of the prostate gland.

An editorial accompanying this New England Journal of Medicine study stated:

“For men who choose regular prostate cancer screening, the use of finasteride meaningfully reduces the risk of prostate cancer and thus the morbidity associated with treatment of the disease.”

In maintaining the conventional party line that recommends against PSA screening, the editorial also stated:

“Men who are aware of and understand the benefits, risks, and uncertainties associated with the use of finasteride for prevention may make a rational decision to take the drug to reduce the potential harms of PSA screening. Of course, another way to reduce the harm of screening is to choose not to be screened.”

Said differently, the author of this editorial is stubbornly sticking to irrational conventional dogma that advises men to avoid prostate cancer screening because of side effects that may occur during needle biopsy or treatment. The data the author is reporting, however, clearly shows that by taking just finasteride alone for a relatively short time period, an aging man can reduce the risk he will ever contract prostate cancer (and thus the need for “harmful” diagnostics and treatment) by 33%!

There is evidence to suggest that prostate cancer risk reduction would have been greater had these men continued taking finasteride. As Life Extension reveals in this month’s issue, there are many other steps men can take to slash low- and high-grade prostate cancer risk, and at the same time, reduce overall incidence of degenerative disease.

Medical Technology Is Regressing!

We are witnessing a lethal regression in the use of technologies that could spare tens of thousands of aging men from prostate cancer deaths each year. Instead of seeking to incorporate proven methods to reduce side effects associated with conventional treatment, doctors are telling patients today to avoid screening. While this will save Medicare and Medicaid big dollars in the short-term, the epidemic of metastatic prostate cancer that will manifest in 5-10 years will extract a horrific toll of human suffering, premature death, and catastrophic costs to government healthcare systems.

Treating metastatic prostate cancer is a prolonged and extremely expensive process. Death can be postponed, but the side effects of treating advanced disease are often harsh.

A Real World Example of What This Nation Faces

When taking on the federal government and medical establishment like Life Extension routinely does, we seek to be meticulously accurate in everything we publish. Our credibility is at stake in every one of these scientific debates.
A friend of mine used to have his blood tested annually using Life Extension’s comprehensive Male Panel that includes PSA. He retired 7 years ago at the age of 60 and received “free” healthcare from his union (and later Medicare). So he stopped using Life Extension’s testing and instead let his doctor prescribe annual blood tests.

Each year he would have his blood tested, and each year his doctor said his results were fine. What my friend did not know is that the doctor stopped testing for PSA. When my friend started developing health problems his wife contacted me and said his doctors could not figure out what was wrong. I suggested he have his blood tested using our comprehensive Male Panel.

His PSA came back at 31. He appears to have metastatic disease and is undergoing aggressive treatment. He wrote me that he was shocked his doctor had not tested for PSA.

What happened to my friend is occurring throughout the United States right now. Doctors are following federal government guidelines and are intentionally omitting PSA screening. This devolution in healthcare must be reversed.

**Startling Statistic Reported by New England Journal of Medicine**

In reporting on the long-term data showing that finasteride slashed prostate cancer risk, the authors of the New England Journal of Medicine editorial opened by stating:

*“With the advent of prostate specific antigen (PSA) testing in the 1980s, the rate of diagnosis of prostate cancer rose dramatically... The timing and magnitude of the 44% reduction in prostate cancer mortality after the widespread adoption of PSA testing suggests that both screening and treatment improvements have contributed to this decline.”*

The authors then go on to list all the side effects of treatment that prompted the federal government to suggest men should avoid PSA screening. Recommending against PSA screening will go down as one of the great travesties in medical history.

Prostate cancer is one of the most prevalent malignancies striking aging men. Technology developed four decades ago has resulted in a steep drop in prostate cancer-related deaths. Yet our federal government proclaimed in 2012 that this technology (PSA screening) should be abandoned.

Don’t be victimized by this nonsense.

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**References**


**Astaxanthin** is a fat-soluble carotenoid compound. The challenge to deriving maximum benefits is its normally limited absorption—as low as about 50%. Assimilation of astaxanthin is impeded by limited uptake and intestinal degradation.

**Astaxanthin 4 mg with Phospho-lipids** combines 4 milligrams of natural astaxanthin with a proprietary blend of phospholipids.

By incorporating phospholipids, scientific study shows that carotenoid absorption may be enhanced several-fold.

**Astaxanthin 4 mg with Phospholipids** uses four different phospholipids to facilitate maximum absorption of astaxanthin into the bloodstream, where it is transported to cells throughout the body.

**ASTAXANTHIN**

Each softgel of Astaxanthin with Phospholipids provides 4 mg of natural astaxanthin along with 80 mg of proprietary phospholipid blend. Just one softgel a day provides tremendous systemic cellular support!

A bottle of 30 softgels of Astaxanthin 4 mg with Phospholipids retails for $16. If a member buys four bottles, the price is reduced to $10.50 per bottle. Contains soybeans.

References
The consequences of sleep deprivation go far beyond fatigue and diminished performance. Sleep deprivation can impact the immune system, the nervous system, memory and cognitive impairment, mood, and more. Ultimately, lack of sleep leads to an overall poor quality of life.

If you’re one of the more than 20 million Americans who suffer from occasional sleep problems, you don’t have to settle for frustrating nights of tossing and turning. A new, fast-acting LIQUID melatonin may enable you to…

TAKE BACK CONTROL OF YOUR SLEEP!
Melatonin is well known for its ability to regulate your body’s internal clock. However, as you grow older, the secretion of melatonin declines significantly as the pineal gland becomes calcified. Fortunately, melatonin has been studied and shown to be effective for managing disturbances in circadian rhythms.

A meta-analysis of 17 studies concluded that melatonin supplementation decreases the time it takes to fall asleep while increasing sleep efficiency and total sleep duration.

In fact, melatonin has been shown to increase the speed of falling asleep—and the quality of sleep—in about 60% of people who use it.

NEW MELATONIN LIQUID DROPS!
Not all people benefit from melatonin when it’s in the form of a capsule or tablet. However, some report that by applying melatonin liquid drops under their tongue at bedtime for immediate absorption, they are able to sleep better. While any kind of liquid melatonin has been reported to work, Life Extension has developed melatonin liquid drops that are completely free of sugars.

This new soothing Fast-Acting Liquid Melatonin has a great tasting natural citrus vanilla flavor and is quickly absorbed for a restful night’s sleep.

An increase in age doesn’t have to mean an increase in sleep problems. Consider making Liquid Melatonin a part of your healthy sleep program.

The retail price for 1 bottle of Fast Acting Liquid Melatonin is $12. If a member buys 4 bottles, the price is reduced to $8.25 a bottle. Seven drops provide about 1 mg of melatonin and there are approximately 1,180 drops in each bottle. Most people place one to two full eyedroppers under their tongues at night which provides 3 to 6 mg of melatonin.

WHY WE NEED SLEEP
Decades of clinical research document that a good night’s rest supports nearly all systems of the body, including:

- Skin health and youthful appearance
- Healthy collagen formation
- Insulin levels already within normal range
- Healthy body weight
- Glucose levels already within normal range
- Blood pressure already within normal range
- Healthy cell division
- Cardiovascular health
- A good mood

References
1. Available at: http://www.webmd.com/sleep-disorders/features/important-sleep-habits
It’s one of the top 10 killers in the US, causing an average estimate of over 30,000 people to die each year. It’s not heart disease or cancer or diabetes… it’s the flu.

Most people associate the flu with muscle pain, coughing, sore throat, fatigue, and other symptoms, but the flu can turn into a deadly infection.

Scientists have found two ingredients that prime the immune system to defend against the onslaught of influenza and other seasonal pathogens that can result in serious illness and even death.
The Deadly Complications of Influenza

If you think of the flu as merely a seasonal risk or inconvenience, think again. Although known for uncomfortable symptoms such as sore throat, nasal discharge, chills, fever, muscle pain, headaches, coughing, nausea, and fatigue—the harsh reality is that tens of thousands of Americans die from influenza infection in an average year.

Potentially lethal results of the flu can include either direct viral pneumonia or secondary bacterial pneumonia, and complications of chronic conditions such as congestive heart failure and chronic obstructive pulmonary disease (COPD).
Almost **90%** of all American deaths caused by influenza are among those over **65 years old**.\(^9\) One reason is the **immune senescence** suffered by virtually all aging individuals. Vaccines function by eliciting an antibody response against specific viruses. The ability to generate an antibody response to influenza vaccines is severely compromised in the elderly.\(^11\)

But the elderly are not the only ones at risk of flu-related death. **High-risk groups** also include pregnant women, the immunocompromised, children under age two, and people who have chronic illnesses such as asthma, diabetes, heart disease.\(^12\)

**The Best Defense Against the Flu**

Receiving an **annual flu shot** is an effort many individuals, particularly those over age 65, make in an attempt to prevent both influenza infection and its deadly outcomes.\(^13\) The reason is that it mobilizes what is known as **adaptive or acquired immunity**.\(^14\) After the body has been “primed” with specific, non-infective viruses in the form of a vaccine, the **immune system** can then make **antibodies** to protect against future infection with these viruses.\(^14\)

However, for a flu vaccine to even begin to protect against the influenza virus contained within it, the vaccinated individual **must first have sound immune function**—so that the immune system can properly respond to stimulation by the vaccine’s antigen.\(^15\)

The trouble is that, in those with **weakened immunity**—such as the elderly population—vaccine stimulation triggers only a **limited** antibody response, thus limiting the effectiveness of the vaccine.\(^16,17\)

That means, despite being vaccinated, aging individuals remain highly susceptible to infection. This can be one reason why up to **91%** of those 65 and over who get a flu shot may still be susceptible to getting the flu!\(^18\)

**Shocking Flu Statistics**

On average, influenza is estimated to cause over **30,000 deaths** in the United States annually.\(^1\)

The **antibody response** of elderly patients to influenza vaccine has been shown to be blunted.\(^11\)

Complications of viral influenza infection may involve **several organ systems**.\(^22\)

Flu shots fail to protect older persons from the most virulent strains up to **91%** of the time.\(^11\)

The flu vaccine’s effectiveness among the general population is only about **56%**.\(^18\)

Flu-related **deaths** for persons over age 85 are **16 times greater** than that of slightly younger persons aged 65-69.\(^23\)

Flu infection is estimated to cause more than **200,000 hospitalizations** annually in the United States.\(^22\)

Chronic medical conditions—such as heart disease, lung disease, diabetes, kidney disease, liver disease, dementia, and stroke—are all risk factors for potentially **lethal** influenza complications.\(^12\)

The most frequent serious flu complications are **pulmonary**, such as primary influenza pneumonia, secondary bacterial pneumonia, or chronic pulmonary diseases.\(^7-9\)

Influenza A caused by H5N1 virus (“avian flu”) often infects **young**, previously healthy persons—with a **fatality** rate of about **60%**, usually due to respiratory failure.\(^24\)

Neurologic complications of influenza, such as encephalopathy, are most common in **children**.\(^25\)

Increased rates of **schizophrenia** were noted in offspring of women who had the flu in the second pregnancy trimester, implying fetal developmental brain effects.\(^26\)

Abnormal cardiac findings were found in **43%** of adult flu patients, suggesting influenza pneumonia may **predispose** patients to serious cardiac complications such as myocarditis and pericarditis.\(^27\)
But there’s good news. Scientists have recently found a way to boost the effectiveness of the flu vaccine. Exciting new evidence shows that, taken together for two weeks prior to vaccination, the amino acids L-theanine and L-cystine enhance the efficacy of the flu vaccine in certain subsets of elderly subjects. This delivers strong protection against the flu virus—and its deadly complications.

These two compounds do not enhance the vaccine itself; instead, they help boost the immune system’s acquired immune response, giving your body the tools it needs to effectively utilize the vaccine.

**Better Together**

When these complementary amino acids were used together in animal studies, they increased immune response. In one study, researchers gave both L-theanine and L-cystine orally to mice for 10 days. Six days after infection with influenza, the treated mice had lower lung concentrations of the virus. Ten days after infection, there was a significant enhancement of key anti-influenza-virus antibodies (called immunoglobulin G or IgG).

Scientists realized that the co-administration of L-cystine and L-theanine could restore age-related impairment of immune competence, helping to prevent influenza and other viral infections—and in turn, preventing deadly complications.

Based on this knowledge, scientists set out to determine if these two substances could boost vaccine effectiveness by targeting (and enhancing) the immune system itself.

**Boosting Vaccine Effectiveness!**

To establish this effect in people, researchers designed a randomized, placebo-controlled study in which both of these amino acids were tested in healthy elderly humans. For the study, 65 nursing home residents aged 65 or over were randomly divided into two groups. The test group received 280 milligrams of L-theanine and 700 milligrams of L-cystine once a day for 14 days. The other group received a placebo for the same amount of time.

On day 15, all participants were given a flu vaccine containing three influenza strains.

The scientists found that certain subsets of the L-theanine and L-cystine group had an increased rate of seroconversion, the precise point at which the immune system develops antibody protection against a microorganism as a result of immunization. Notably, the increased seroconversion rate occurred among

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**What You Need to Know**

- On average each year, it is estimated that over 30,000 Americans die from influenza.
- The recommended annual flu shot protects older Americans from a virulent strain as infrequently as 9% of the time and protects the general population only 56% of the time. One of the reasons is that in the elderly, who are far more likely to have generalized weakened immunity, vaccine stimulation triggers only a limited antibody response.
- Taken together for two weeks prior to vaccination, the amino acids L-theanine and L-cystine enhance efficacy of the flu vaccine in a subset of elderly subjects. This delivers stronger protection against both the flu virus—and its deadly complications.
- Remarkably, this same combination has been shown to reduce the incidence of the common cold by 58%.
The Aging Immune System

A compromised immune system can present an opportunity for a simple bout of the flu to quickly progress to full-blown pneumonia, which is the eighth leading cause of death for Americans.2

Nutritional deficiencies among the elderly can lower immune defenses.28 For instance, deficiency of iron, vitamin B12, or folate is a common cause of the increased incidence of anemia in the elderly, and this in turn is associated with a greater risk of infectious diseases.5 In fact, malnutrition at any age causes a decline in immune function and increased susceptibility to infection.5,28-30

Further compounding the problem, millions of doctors erroneously prescribe antibiotics to patients seeking relief for symptoms of viral infections. Persistent misuse of antibiotics leads to potentially serious treatment complications, greater risk of death, and may contribute to the development of antibiotic-resistant pathogens.31

As numerous strains of influenza viruses continue to evolve and pose a deadly danger of complications to aging individuals, scientists recognized the urgent need to find a safe and effective way to reverse the reduced effectiveness of flu vaccines caused by age-related immune decline.

If taken together for two weeks prior to vaccination, the amino acids L-theanine and L-cystine enhance efficacy of the flu vaccine in certain groups of elderly subjects.19 This delivers stronger protection against both the flu virus—and its deadly complications.

...subjects with low serum total protein or hemoglobin, potential indicators of compromised health.19

The report concluded that, "Co-administration of L-cystine and L-theanine before vaccination may enhance the immune response to influenza vaccine in elderly subjects with low serum total protein or hemoglobin."

In another human study, this same combination has been shown to reduce the incidence of the common cold by 58%.5

Reduce the Risk of Common Cold

If co-administration of these two amino acids could boost the effectiveness of the flu vaccine, scientists reasoned that it might also help lower the incidence of the common cold.

The common cold is the most prevalent human illness.5 The majority of cases are acute viral infections of the upper respiratory tract. Conventional treatments such as analgesic agents and antihistamines only help alleviate some of the symptoms, such as sneezing and runny nose.5

Because common colds can lead to serious complications in elderly and immune-compromised individuals,21 scientists set out to determine if L-theanine and L-cystine, could also reduce the incidence of the common cold.

For the placebo-controlled study, 176 healthy men were asked to take a total of 700 milligrams of L-cystine and 280 milligrams L-theanine per day, in two divided doses.5

Over a five-week period, the L-theanine and L-cystine group developed 58% fewer colds than the placebo group.5 Among those experiencing colds, the symptoms of fever and chills were significantly reduced in the theanine/cystine supplemented group.5

The study team reported that, together, L-theanine and L-cystine represent an effective and safe natural ingredient to suppress the common cold—producing no more side effects than placebo.5
Summary

The flu can mean more than symptoms such as muscle pain, nausea, and sore throat.1 On average, over 30,000 Americans die annually from influenza.1

To help prevent death from the flu’s lethal secondary infections and other complications, many people choose to receive an annual flu shot.13 However, because older adults often have a weakened immune system, the vaccine may only be effective as infrequently as 9% of the time—and only 56% of the time in the general population.16-18

However, when taken together for two weeks prior to vaccination, the amino acids L-theanine and L-cystine boost the efficacy of the flu vaccine in certain elderly subjects by enhancing the immune system itself.19 The result is enhanced protection against both the flu virus—and its deadly complications.

Remarkably, this same combination has been shown to reduce the incidence of the common cold by 58%.5

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


A large, rigorous study published in the New England Journal of Medicine confirmed the health benefits of those who switch to a Mediterranean diet rich in omega-3 fish oil as well as protective nutrients called polyphenols found in olive oil, fruits, vegetables, nuts like walnuts, and wine.1 The study ended early because the benefits were so overwhelming, with startling benefits for vascular health, that it was considered unethical to continue to deprive the control group.1

In addition to the health-promoting benefits of vegetables and fruits with their abundance of polyphenol nutrients, the Mediterranean Diet group took at least 4 tablespoons of polyphenol-rich extra-virgin olive oil a day.1

LIFE EXTENSION® MEMBERS LONG AGO BENEFITED

Starting in 2005, Life Extension members began taking a supplement (Super Omega-3) that provided potent concentrations of fish oil and olive polyphenols like hydroxytyrosol and oleuropein. This supplement also provided standardized sesame lignans to support the beneficial effect of omega-3 fatty acids in the body.2

Olive oil contains polyphenol nutrients that have demonstrated wide-ranging health benefits.2,3 The recommended twice daily dose of Super Omega-3 supplies a similar polyphenol content to that found in 4 to 6 tablespoons of olive oil.

SUPER OMEGA-3 WITH SESAME LIGNANS AND OLIVE FRUIT EXTRACT

To ensure the purest, most stable, and easy-to-tolerate fish oil, Super Omega-3 EPA-DHA is molecularly distilled. It enjoys the highest 5-star rating for purity, quality, and concentration from the renowned International Fish Oil Standards program.6 The sesame lignans not only direct the omega-3s toward more effective pathways in the body, but guard the delicate fish oil from oxidation.2,7

A bottle containing 120 softgels of Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract retails for $32. If a member buys four bottles, the price is reduced to $21 per bottle. If 10 bottles are purchased, the cost is $18.68 per bottle. (Item #01482)

The daily dose (four regular size softgels) of Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract provides:

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To order the most advanced fish oil supplement, Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract (with or without enteric coating), 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.
To order Neuro-Mag™ Magnesium L-Threonate Capsules or Powder call 1-800-544-4440 or visit www.LifeExtension.com

Capsules or Powder... Value Priced

The suggested daily dose of three Neuro-Mag™ Magnesium-L-Threonate Capsules provides 2,000 mg of Magnesium-L-Threonate. While supplying a modest 144 mg of elemental magnesium, its superior absorption into the bloodstream and nervous system make it a preferred choice for maturing individuals to supplement with.

This same brain-health supporting magnesium is also available in a natural lemon flavor called Neuro-Mag™ Magnesium-L-Threonate with Calcium and Vitamin D3 Powder. In addition to its fresh lemon flavor, the one-scoop per day serving supplies the same amount of magnesium as the capsules plus 500 mg of highly soluble calcium and 1,000 IU of vitamin D3.

A bottle containing 90 vegetarian capsules of Neuro-Mag™ Magnesium-L-Threonate or a jar containing 30 scoops of Neuro-Mag™ Magnesium-L-Threonate with Calcium and Vitamin D3 Powder retails for $40. If a member buys 4 units, the price is reduced to $27 per unit.

References
Every winter, human immune systems are overworked as they provide essential defense against seasonal challenges—especially the immune systems of the elderly and very young.¹,⁴

A crucial part of this protection comes from the immune system’s production of new antibodies when the new winter season’s pathogens are first introduced, which boosts the body’s preparedness for upcoming challenges during peak winter outbreaks.⁵

In a remarkable discovery, the amino acids in Winter Wellness™ have been shown to work together to prime the immune system to optimize immune responsiveness.¹,⁶-⁸

Taken daily, they support the host immune system’s primary defenders by enhancing the function of key immune cells to generate antibodies and naturally prime readiness—especially when taken at least two weeks prior to the first pre-season exposure to the winter’s new antigen challenges.⁶,⁷

Optimized Immune Responsiveness to New Winter Challenges

L-theanine is a distinctive amino acid found almost exclusively in tea leaves.⁸ L-cystine is an amino acid synthesized by the body from the cysteine molecules found in many plant and animal food sources.⁹ Scientists have found that L-theanine and L-cystine have potent, complementary effects on immune responsiveness.⁶,⁷

Now combined in the next-generation, immune-supporting product Winter Wellness™, L-theanine and L-cystine promote the natural enhancement in responsiveness that follows pre-season antigen-exposure by:

- Helping to enhance gamma delta T cells, ensuring an optimum state of readiness to respond through secretion of interleukin-2—a powerful immune regulator.⁶
- Supporting the release of immune system proteins that coordinate interactions between T cells and antibodies—further promoting immune responsiveness.¹⁰
- Contributing to the synthesis of glutathione—a potent endogenous antioxidant—that has a marked effect on immune function.⁶,¹¹

Scientific data supports that when these potent amino acids are used together, they support an enhanced post-exposure immune response.⁶,⁷

To order Life Extension® Winter Wellness™, 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.
From Quarterback to GIVING BACK

Whether it’s in the broadcast booth or a booth at his restaurant, football star Joe Theismann projects a healthy lifestyle wherever he goes.

He’s donned the famous golden dome football helmet for Notre Dame and the storied jersey of the Washington Redskins, but these days, a simple pair of orange suspenders suits NFL icon Joe Theismann just fine. No, the suspenders don’t provide any protection from blitzing linebackers or inspire Skins fans to do the wave, but they do bring attention to a cause near and dear to his heart: raising awareness for AAA screening.

“AAA stands for Abdominal Aortic Aneurysm,” Theismann explains. “My dad is an AAA survivor, and because of this, I’m working with the ‘Find the AAAnswers’ campaign to help raise awareness about this silent killer and encourage at-risk individuals to go get screened.”

Theismann, a former Pro Bowl NFL quarterback accustomed to studying film for hours to prepare for a defense, has taken the same approach to learn about the dangers of AAA.

“AAA is a very serious health problem” he says. “And the risk factors are fairly common. If you’ve smoked more than 100 cigarettes in your life, have a history of heart problems, are over 60 and male – you could be at risk for AAA. Getting screened is important.”
As Theismann talks, his voice takes on a commanding, yet congenial tone; clearly, leading a cause comes to him just as easily as leading an offense, which is why we can now add AAA Advocate to the seemingly endless list of titles he has accumulated over the years, including Notre Dame All-American, NFL MVP, Super Bowl Champion, Pro Bowler, Restaurateur, and Sportscaster.

Although this isn’t the first time Joe has been involved with a cause; in 1982, he was selected the NFL’s Man of the Year for his community service and dedication to the health and welfare of children. >
He also advocates listening to your body, particularly in the area of needing rest. Where once he would workout for days on end without a break, he acknowledges that his body takes a little longer to recuperate, and that if you don’t give your body adequate time to recover, you defeat the purpose of exercise. Of course, finding the time is also a challenge when you travel to football games for a living.

MUSCLE MAINTENANCE

“My experience with the NFL has given me the opportunity to lend my voice to help raise awareness about important public issues,” Theismann says. “When I am asked to do a presentation I am representing what I believe to be a healthy lifestyle. I pride myself on my appearance.”

At age 64, Theismann’s appearance is still strikingly similar to how he looked during his playing days, where he filled out his six-foot frame with around 190 pounds of muscle.

“When I was younger, working out was about getting stronger,” he says. “Now it’s all about maintenance. As I’ve gotten older, I try to maintain muscle density.”

In addition to the health benefits of maintaining a strong physique, he cites another, more practical reason for his maintenance routine. “As you get older, you invest in suits, pants, and shirts. As far as I’m concerned, if I were to commit myself to a full lifting program, I’d need to buy a whole new wardrobe!”

He says the last line with the trademark laugh that we’ve heard countless times from the broadcast booth. But sartorial concerns aside, he happens to stick to a very impressive workout routine, including weight training two or three times a week in addition to cardio four times a week.

“There are three elements of exercise that are very important,” he says. “Cardio, flexibility, and strength. People tend to confuse flexibility with stretching, but it’s different. Flexibility involves having the full strength of the muscle throughout an entire range of movement. I want to be flexible.”
STAYING HEALTHY ON THE GO

“I feel that I’m disciplined enough to find time for it,” he says. “I’ll work out early in the morning or late at night, but I’m comfortable with the fact that I’ll find time for it somewhere in the day, even if I have to be creative.”

By creative, he goes on to explain that if he’s at a hotel that doesn’t have a great workout facility, he’ll create an entire workout in his room. These on-the-fly exercise routines include doing curls and triceps kickbacks with his briefcase, dips on the edge of the bathtub, angled pushups on a bed or desk, abdominal work on the floor, and a series of stretches that he can do anywhere.

“There can be fifty excuses for why you can’t work-out,” he says. “But once you get going, you feel like you can go on forever. You just feel great.”

Traveling also poses a problem when it comes to eating correctly. In general, Theismann sticks to what he calls a “king, prince, pauper” diet, where he eats like a king for breakfast, a prince for lunch, and a pauper for dinner.

“I usually eat a big breakfast,” he says. “I’ll have some raisin bran with fruit, some toast, and eggs. For lunch I’ll have maybe half a sandwich with soup and a salad. And for dinner I’ll have a small portion of pasta and some roasted chicken. Then I’ll have an orange or apple before bed. If I’m traveling and I haven’t had a chance to eat before I go to sleep, I probably won’t eat and I’ll just give my stomach a rest. I think it’s hard to sleep when you have a ton of food in your stomach.”

Supplements are an important part of his diet as well. Because of his family’s history of heart problems, Theismann takes CoQ10 in addition to his daily multivitamin. He also takes a vitamin B supplement and lysine.

But the supplements, the exercise, and the eating plan are all part of a bigger overall strategy for healthier living.

“When I get up in the morning, my hip is sore, my back is sore, things are sore,” he says. “I used to be able to get up and go. Now I get up, I walk around, I get all the parts going. You think you can do the same things you did 5 or 10 years ago, but it just takes a little longer. The body doesn’t take very long to get going. You just have to work your way up. You’ll eventually get back there.”

For more information visit www.findtheaaanswers.org

If you have any questions on the scientific content of this article, please call a Life Extension® Health Advisor at 1-866-864-3027.
Many individuals have tried a host of remedies in an attempt to soothe their digestive tracts, but some still have an issue with gastric distress—with resulting discomfort along the delicate lining of the esophagus.

A novel solution is now available in the form of what scientists call raft-forming alginate.

This blend of ingredients in Esophageal Guardian provides a totally unique approach to protecting esophageal tissue against harsh stomach acids.

**RAFT-FORMING ALGINATE**

The mechanism behind Esophageal Guardian involves the formation of a temporary physical barrier—or raft—between the stomach and the esophagus. The secret to this technology is what happens when alginic acid and potassium bicarbonate come into contact with gastric acids. Alginic acid forms a gel and potassium bicarbonate produces bubbles that get trapped in that gel—producing a floating foam layer that sits above the contents of the stomach.

Immediately, two other ingredients in this formulation—calcium carbonate and magnesium carbonate—react with the stomach acid to create lift in the foam and make it firmer.

Clinical studies show that this temporary foam barrier provides maximum support for delicate esophageal tissues.

Also, the carbonate and bicarbonate in these ingredients help neutralize stomach acid.

This protective foam barrier develops less than a minute after two natural berry flavor tablets of Esophageal Guardian are chewed and swallowed. Yet the relief it provides lasts up to 4 hours.

Quite simply, Esophageal Guardian Natural Berry Flavor delivers the fastest-acting, longest-lasting, and advanced technology to support delicate esophageal and stomach tissues against gastric distress.

The suggested dosage of two (2) chewable tablets of Life Extension® Esophageal Guardian Natural Berry Flavor chewed after the heaviest meal of the day with 4 to 8 ounces of water, or as recommended by a healthcare practitioner, provides:

**Alginic acid** 1,000 mg
**Calcium** (as calcium carbonate) 80 mg
**Magnesium** (as magnesium carbonate) 40 mg
**Potassium** (as potassium bicarbonate) 40 mg
**Strawberry extract** (fruit) 416 mg
**Ellagic acid** [from pomegranate extract (hull) and strawberry extract (fruit)] 35 mg

A bottle of 60 chewable tablets of Life Extension® Esophageal Guardian Natural Berry Flavor retails for $36. If a member buys four bottles, the price is reduced to $24 per bottle.

To order Life Extension® Esophageal Guardian Natural Berry Flavor, 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.
Overlooked in the effort to support sexual function in aging men is the health of the vascular system. Blood flow through the delicate lining of the arteries (the endothelium) is essential to sexual arousal, so it should come as no surprise that endothelial function is closely associated with male sexual capacity.¹

Life Extension has discovered supportive clinical research for a scientifically validated, nutrient formula to promote endothelial function and blood flow to the place men need it most—for maximum performance.

The ingredients found in Prelox® Natural Sex for Men® have yielded compelling and highly satisfactory results in five independent clinical studies.²-⁶

Our analysis also confirms that unlike some performance enhancement supplements marketed as “natural,” Prelox® Natural Sex for Men® is not adulterated with trace amounts of prescription drugs.

**A Powerful Synergy to Support Sexual Health**

The patented blend of the following ingredients positively affects the male physiology in three ways, to provide optimal support:

1. **PYCNOGENOL®** (standardized French maritime pine bark extract) activates endothelial nitric oxide synthase (eNO-S), the enzyme required to make nitric oxide. Nitric oxide (NO) relaxes the vessels that enable efficient blood flow—the key to healthy male sexual activity and overall vascular health. Pycnogenol® further amplifies this relaxing effect by extending the amount of time nitric oxide remains in the bloodstream.

2. **L-ARGININE** is the biological precursor to nitric oxide synthesis in the endothelium. It interacts synergistically with Pycnogenol® to sustain nitric oxide levels sufficient for healthy sexual function.

3. **ICARIN**—from a natural botanical extract used in traditional Chinese medicine—has been shown to deactivate the enzyme normally responsible for winding down male sexual response, further promoting sustained activity. Prelox® Natural Sex for Men® contains a standardized extract providing a proprietary form of high-quality icariin.

A 60-tablet bottle of Prelox® Natural Sex for Men® retails for $52. If a member buys four bottles, the price is reduced to just $36 per bottle.

**References**


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**Item # 01373**

To order Prelox® Natural Sex For Men®, call 1-800-544-4440 or visit www.LifeExtension.com

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A remarkable new study has validated a method to slow prostate cancer progression that was long ago recommended to Life Extension members. What made this study even more noteworthy is where it was presented.

The annual gathering of the American Society of Clinical Oncology (ASCO) is considered the world’s most prestigious cancer forum. More than 25,000 oncology experts attend this meeting, and the media eagerly reports on meaningful advances in cancer prevention and treatment.

At the 2013 ASCO meeting, findings from a study were released that underscored how effective certain natural compounds can be as a prostate cancer therapy.

In this placebo-controlled, double-blind trial of treatment-refractory prostate cancer patients, a four-nutrient supplement resulted in a 63.8% median reduction in the increase of PSA levels.¹ The PSA marker is used by oncologists to determine progression or regression of prostate cancer, and to evaluate whether treatments are working or failing.

In the study presented at ASCO, patients with a PSA relapse after radiotherapy or surgery for localized prostate cancer took two daily capsules containing pomegranate seed, broccoli, green tea, and turmeric. Over a six-month period, median PSA levels increased only 14.7% in the supplement group—compared to 78.5% in the placebo group!¹ PSA levels remained stable, or below, baseline values for a compelling 46% of the supplement patients—but for only 14% of the placebo patients.

Prostate cancer is the most common malignancy in US men (excluding non-melanoma skin cancer),² affecting one male in every six.³ Autopsy findings show a significant percentage of men have underlying prostate cancer without even knowing it.⁴ ⁶

This article will present evidence about the prostate cancer preventing effects of a wide range of nutrients. What makes this topic so compelling are the recent findings presented at ASCO showing that pomegranate seed, green tea, broccoli, and turmeric (source of curcumin) were so effective in prostate cancer patients.¹ The implication is that these nutrients may also afford considerable protection against prostate cancer progression. >
A comprehensive defense against prostate cancer involves healthy diet, supplemental nutrients, hormone balance, and annual PSA screening. The foods and nutrients described herein have been documented in published studies to target prostate cancer and help prevent or attenuate its development. As a bonus, they also confer huge protection against other age-related disorders.

Since there are overlapping mechanisms of action amongst many of these foods/nutrients, it may not be necessary to take every one of them. Most impressive, however, is the voluminous amount of scientific evidence that substantiates the anti-cancer properties of these nutrients. Yet mainstream medicine remains largely in the dark.
1. Flaxseed

Flaxseeds provide a rich supply of lignans and essential fatty acids that promote prostate health. The lignans in flaxseed are believed to offer protection against chronic disease and cancer, including hormone-dependent malignancies.1,9

A large study demonstrated that men with higher enterolactone levels were up to 72% less likely to have prostate cancer than those with the lowest levels.10 Studies have confirmed that flaxseed supplementation lowers PSA levels, and significantly reduces the proliferation of normal prostate cells and prostate cancer cells.9,11 A pilot study on men who were scheduled to have a repeat prostate biopsy found that supplementation with flaxseeds, as part of a low-fat diet, lowered levels of PSA and prostate cell proliferation.9

2. Boron

Research has shown that boron can reduce the risk of prostate cancer.12 In one study, men with the highest boron intake showed a 54% lower risk of prostate cancer compared to those with the least intake.13

In a validated animal model of prostate cancer, researchers found that oral administration of various concentrations of a boron-containing solution led to 25-38% decreases in tumor size, and 86-89% reductions in PSA levels.14 The suggestion that supplemental boron may help to shrink prostate tumors while also decreasing levels of PSA is exciting. That’s because PSA—in addition to being an important prostate cancer marker—may itself be a contributor to prostate cancer promotion.15

Boron compounds inhibit the activity of prostate-specific antigen (PSA).14 Higher boron levels in the blood lower the risk of prostate cancer by reducing intracellular calcium signals and storage.16 At normal concentrations, boron operates selectively—inhibiting prostate cancer cell proliferation while allowing normal prostate cells to grow.17

The typical daily intake range for boron is 1-8 milligrams daily, however individuals living in boron rich environments may consume far greater than this amount.18 If lab studies can be replicated in human patients, higher daily dosages may become an effective and low-cost adjuvant therapy. Life Extension® members already obtain boron (3-6 mg) in their supplements.

3. Cruciferous Vegetables

In recently released studies, three phytochemicals derived from cruciferous vegetables (such as broccoli) have shown promise in inhibiting prostate cancer in experimental models.19,20 Because their chemical names are challenging—indole-3-carbinol, 3,3’-diindolylmethane, and phenethyl isothiocyanate—they are better known as I3C, DIM, and PEITC, respectively. I3C has several different actions that help prevent and inhibit prostate cancer. It helps activate detoxification pathways, prevents cancer cell growth, induces apoptosis, regulates gene expression, protects DNA from damage, and modulates a variety of cell signaling pathways.20-23

DIM has been shown to protect against prostate cancer by inhibiting the phosphorus-transferring enzyme Akt, inhibiting the master DNA-transcription regulator nuclear factor-kappaB (NF-kB)—and blocking the crosstalk between them.24 This is a novel mechanism through which DIM inhibits cell growth and induces apoptosis in prostate cancer cells, but not in non-tumorigenic prostate epithelial cells.24 The ability of DIM to target aberrant epigenetic changes coupled with its ability to promote the detoxification of carcinogens, make it an effective chemopreventive agent as it is able to target multiple stages of prostate carcinogenesis.18

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In a study released in May 2013, PEITC was found to suppress a compound known as PCAF (P300/CBP-associated factor)—which in turn inhibits androgen receptor-regulated transcriptional activity in prostate cancer cells.19 Daily suggested dosages are 14 milligrams for DIM, and 80-160 milligrams for I3C. An I3C dosage of 200-600 milligrams daily is suggested as an adjuvant for prostate cancer therapy. Dosages for PEITC are not well-established.
4. *Vitamin D*

As the *New England Journal of Medicine* clarified, “Cancer results from the accumulation of mutations in genes that regulate cellular proliferation.” In other words, cancer is essentially caused by the genetic mutations that occur over the lifespan. The fascinating impact of vitamin D is that it protects against cancer by enabling us to regain control over the genes that regulate cell proliferation. Vitamin D affects at least 200 human genes. These genes are responsible for regulating crucially important aspects of cells: their proliferation, differentiation, and apoptosis.

In recent years, a multitude of studies have shown cancer risk reductions of 50% and greater based on higher vitamin D status. People with higher vitamin D levels have lower risks of lethal prostate cancer, as well as reduced risks of other cancers. Individual blood testing is needed to determine individual-appropriate dosages, which typically range from 2,000 to 10,000 international units (IU) daily for prevention. Life Extension suggests an optimal vitamin D blood level of 50-80 nanograms per milliliter (ng/mL).

5. *Soy Isoflavones*

Some studies show that the highest intake of soy-based foods correlates with a 42-75% lower risk of prostate cancer. Early animal studies found that this difference is most likely attributable to soy isoflavones inhibiting prostate tumor growth by acting directly against tumor cells and indirectly against tumor neovasculature (growth of new blood cells). Human studies support this evidence.

Japanese scientists took blood samples from over 14,000 men during 1988-1990. Their analysis clearly established that elevated serum levels of all three isoflavones assessed—*genistein*, *daidzein*, and *equol*—imparted strong protective effects against prostate cancer. Men with the highest circulating levels of genistein, daidzein, and equol reduced prostate cancer risk by 62%, 59%, and 66%, respectively. Genistein and daidzein are found in soy, and equol is derived from daidzein by bacterial flora in the intestines. Also, genistein was shown to have “potent anti-proliferative effects” against human prostate cells and inhibit metastatic potential of sex gland cancers such as prostate cancer. Genistein also

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**Prostate Cancer Prevention**

- Prostate cancer affects *one male in every six*, and a significant percentage of men have underlying prostate cancer without even knowing it.
- New research reveals the effectiveness of a number of compounds in preventing and inhibiting this disease. We present here a comprehensive arsenal of tools available to prevent, monitor, and attenuate this disease.
- Aging men seeking to live a long and healthy life must be serious about avoiding the development of prostate cancer and serious about reversing its progression.
- These men—and their support network—now have, in one place, the latest scientific information they need to start a broadly effective, multi-action defense program today.
blocks an enzyme that destroys an anticancer vitamin D metabolite in cancer cells. A suggested dosage of soy isoflavones is 135-270 milligrams daily with food.

6. Green Tea Extract

Laboratory research with cultures has long suggested that green tea catechins, including epigallocatechin-3 gallate (EGCG), may inhibit the growth of cancer cells. Evidence from human studies now demonstrates that green tea compounds can help prevent prostate cancer. A clinical trial demonstrated that green tea catechins were 90% effective in preventing prostate cancer in men with pre-malignant lesions. Researchers recruited 60 men, aged 45-75. Thirty participants received 200 milligrams of green tea catechins (50% EGCG) three times daily, while the other 30 subjects received a placebo. Biopsies were conducted at six and 12 months. Remarkably, only one man in the treatment group was diagnosed with prostate cancer, compared to nine men in the control group who developed the disease. No significant side effects or adverse reactions were reported. The lead researcher concluded that "90% of chemoprevention efficacy could be obtained by [green tea catechin] administration in men prone to developing prostate cancer." 

Mother Nature has also shown efficacy as an adjunctive therapy. Prostate cancer patients were given 1,300 milligrams of green tea polyphenols, mostly EGCG, prior to the time of radical prostatectomy. They showed significant reductions in PSA and other tumor promoters such as vascular endothelial growth factor. Suggested dosages of EGCG are 300-350 milligrams daily, and adjuvant cancer therapy dosages of EGCG range up to 3,000 milligrams daily. The FDA, however, does not believe there is sufficient evidence to say that green tea reduces prostate cancer risk. A federal judge ruled against the FDA’s attempt to suppress claims that green tea may reduce prostate cancer risk.

7. Omega-3 Fatty Acids

In scientific studies, high blood levels of the omega-3 fatty acids DHA and EPA (docosahexaenoic acid and eicosapentaenoic acid, respectively) have been demonstrated to correspond to a lower risk of developing prostate cancer. EPA has been shown to suppress the formation of the omega-6 fatty acid arachidonic acid (AA) by inhibiting the enzyme delta-5-desaturase. EPA has also been found to contribute to the inhibition of uPA—a substance known as urokinase-type plasminogen activator believed to play a role in prostate cancer invasion and metastasis.

Although cold water fish such as tuna, sardines, herring, and salmon provide a rich omega-3 source, commercially available pharmaceutical-grade fish oils also deliver large amounts of EPA and DHA. Suggested dosages are 2-4 grams of fish oil concentrate supplying 700-1,400 milligrams of EPA and 500-1,000 milligrams of DHA, daily with food. For adjuvant cancer therapy, recommended dosages are 4-8 grams of fish oil concentrate supplying up to 2,800 milligrams of EPA and up to 2,000 milligrams of DHA, daily with food.

8. Curcumin

Curcumin strikes at multiple targets in prostate cancer. It induces apoptosis, interferes with the spread of cancer cells, and regulates inflammatory responses through the master regulator nuclear factor-kappaB (NF-kB), a protein complex that controls the transcription of DNA. Natural molecules that inhibit NF-kB can limit inflammatory changes. Prostate cancer is often dependent on sex hormones for its growth; curcumin reduces expression of sex-hormone receptors (androgen receptors and androgen receptor-related cofactors) in the prostate. This speeds androgen receptor breakdown and impairs cancer cells’ ability to respond to the effects of testosterone.

Both in vitro and in vivo models demonstrate that curcumin inhibits prostate cancer promotion by blocking metastases of cancer cells in the prostate, and
by regulating enzymes required for tissue invasiveness.\textsuperscript{63,64} In certain human prostate cancer cell lines, curcumin completely inhibited a type of phosphorus-transferring enzyme known as \textit{Akt} (also known as \textit{protein kinase B} or \textit{PKB}), suggesting that curcumin inhibits prostate cancer cell growth through this Akt-inhibiting mechanism.\textsuperscript{65} Curcumin has been shown to inhibit angiogenesis in prostate cancer cells \textit{in vivo}.\textsuperscript{66} A novel manufacturing technology has produced a patented curcumin formulation that absorbs up to \textbf{seven times better} than conventional curcumin.\textsuperscript{67} If supplementing with this highly absorbed curcumin formulation (BCM-95\textsuperscript{\textregistered}), suggested preventive dosage is \textbf{400 milligrams daily} with food. A suggested dosage of this formulation for adjuvant cancer therapy may be \textbf{800-1,200 milligrams daily} with food.

\section*{9. Coenzyme Q10}

Low blood levels of coenzyme Q10 (CoQ10 or Q10) have been found in patients with a variety of cancer types.\textsuperscript{68,69} Several published animal and human studies have demonstrated CoQ10’s remarkable effects against some cancers,\textsuperscript{70-77} but research into its potentially protective effects against prostate cancer has been very limited. In 2005, after reviewing anecdotal reports appearing in the peer-reviewed scientific literature, the National Cancer Institute (NCI) reported that coenzyme Q10 has been anecdotally reported to lengthen the survival of patients with cancer of the prostate, as well as several other cancers.\textsuperscript{78} Despite these findings, the NCI pointed out that the absence of a control group in the human studies and other scientific weaknesses made it impossible to determine whether these beneficial results were directly related to CoQ10 therapy.\textsuperscript{78}

Later that same year, University of Miami researchers reported research showing that adding coenzyme Q10 \textit{in vitro} to the most common prostate cancer cell line, PC3, inhibited cell growth by \textbf{70\%} over 48 hours.\textsuperscript{79} Evidence suggested that there had been a reduction in the expression of a key, anti-apoptotic gene protein, bcl-2, and through this mechanism, CoQ10 had restored the ability for apoptosis, allowing the cancer cells to kill themselves. “The most amazing part,” said UM research associate Niven Narain, “is that we’ve been able to restore a cancer cell’s ability to kill itself, while not impacting normal cells.”\textsuperscript{79} The suggested preventive dosage of coenzyme Q10 is \textbf{100 milligrams daily}, and a suggested adjuvant dosage is \textbf{200-500 milligrams daily}, both taken after a meal.

\section*{10. Gamma-Tocopherol Vitamin E}

A large study showed that the risk of prostate cancer declines with increasing concentrations of the \textit{alpha}-tocopherol form of vitamin E, with the highest level corresponding to a \textbf{35\% lower} risk; however, these protective effects were \textit{only} observed when levels of \textit{gamma}-tocopherol and levels of selenium were also high.\textsuperscript{80}

Men with the highest \textit{gamma}-tocopherol levels, those in the highest fifth of the distribution, were found to have a \textbf{5-fold greater reduction} in the risk of developing prostate cancer than men in the lowest fifth.\textsuperscript{80} Other research has shown that vitamin E reduces the growth rate of \textit{existing} prostate cancers that are specifically exacerbated by a high-fat diet—reducing tumor growth rate within a high-fat diet to the same tumor growth rate as in a lower-fat (ideal) diet.\textsuperscript{81}
Scientists found that lycopene works by reducing oxidative stress in prostate tissue; lowering inflammatory signaling; preventing DNA damage; modulating expression of endocrine growth factors; and may block cancer cells from growing out of control through enhanced communication between cancer cells at “gap junctions.” Lycopene also may slow the new blood vessel growth that prostate cancers need for development. Suggested dosages of 15-30 milligrams daily are for prevention and up to 45 milligrams daily with food for adjuvant support in existing prostate cancer.

### 12. Selenium

The body only needs small quantities of selenium. But blood levels of this mineral decrease with age, placing middle-aged to older men at high risk for inadequate selenium levels. Lower levels of selenium in the blood can correspond to an increased risk of an enlarged prostate, the condition known as benign prostatic hyperplasia (BPH). Low selenium levels were also found to parallel a four- to five-fold higher risk of prostate cancer. Remarkably, supplementation with selenium has been demonstrated to produce an up to 63% reduced risk of prostate cancer. The mechanism behind this protection appears to be related to an antiproliferative effect, resulting from selenium’s upregulation of cell-cycle regulators. However, confusion arose in 2009 due to publication of a single negative study that substantially contributed to misinformation about the value of selenium against prostate cancer. Known as SELECT—for Selenium and Vitamin E Cancer Prevention Trial—the study appeared to show that selenium, alone or in combination with vitamin E, had no detectable effect on preventing cancers. Many experts have since condemned the trial’s methodology and conclusions—and for a number of reasons.

One problem with the 2009 study was that it used only a single form of selenium. This selenium compound is just one of several different forms in which selenium is available for nutritional supplementation. Data indicate that three forms of selenium—the two organic forms called L-selenomethionine and selenium-methyl L-selenocysteine, plus the inorganic form known as sodium selenite—have different degrees of action with regard to the effect on any incipient cancer cells that might be developing. Using one form weakened the potential protective benefits in the study.
More importantly, the highly flawed 2009 SELECT study used only one form of vitamin E, a synthetic form known as dl-alpha tocopheryl acetate. We have known for about 15 years that when alpha tocopherol is taken by itself, it displaces critically important gamma tocopherol—the form of vitamin E that is the most protective against prostate cancer.84,108-112 By supplementing aging men with only one form of vitamin E, synthetic dl-alpha tocopheryl acetate, scientists in the 2009 SELECT study may have unwittingly increased subjects’ prostate cancer risk by depriving prostate cells of critical gamma tocopherol. Then, a 2011 meta-analysis of nine randomized, controlled clinical trials including 152,538 participants established that selenium supplementation cut risk for all cancers by 24%. The cancer-protective effect rose to 36% in people with low baseline selenium levels.113

Based on research involving non-melanoma skin cancer patients—in which patients received either 200 micrograms daily of selenium or a placebo—researchers concluded that selenium supplementation can slash the risk of dying from any type of cancer by 50%.114 Also, selenium’s efficacy could potentially be enhanced: one study observed the protective effects of high selenium levels against prostate cancer only when the concentrations of gamma-tocopherol, an isomer of vitamin E, were also high—suggesting that these two nutrients may work best together.80 It is suggested that selenium be taken at dosages of 200 micrograms daily with food.

13. Zinc

Evidence suggests that zinc may play an important and direct role in the prostate. For example, studies found that total zinc levels in the prostate are much higher than in other soft tissues in the body, and those with prostate cancer have been shown to have exceedingly low levels of zinc in the prostate.115,116 Also, in normal prostate cells, zinc is highly concentrated intracellularly in the glandular epithelium—but adenocarcinoma cells taken from prostate tumors have lost their ability to amass zinc.117-119 Supplementation with 15 milligrams of zinc daily showed a trend toward modestly reduced risk of all invasive prostate cancers, but there was a significant 66% reduction in risk of advanced prostate cancer.120 This indicates that zinc supplements may be beneficial in some subgroups of men for the most advanced forms of the disease. There was also a greater reduction in prostate cancer risk from zinc supplementation among men whose vegetable intake was high.120 Suggested preventive and adjuvant zinc dosages range between 15 and 50 milligrams a day.

14. Milk Thistle

Evidence demonstrates that the compounds in milk thistle—isosilybin, silibinin, and silymarin—offer protection against prostate cancer. Both silibinin and silymarin and are strong antioxidants and inhibit human carcinoma cell growth and DNA synthesis.121 Silibinin was found in animal research to exert cancer-fighting effects against an advanced form of human prostate tumor cells, resulting in a decrease in proliferation and an increase in programmed cancer-cell death.122,123 Silymarin may block cancer cell development and growth; it was found to contain one or more constituents that induce cancer cell apoptosis and inhibit mitogenic (cell-division promoting) and survival signaling by prostate cancer cells, showing silymarin’s ability to tackle cancer from a number of different angles.124 Both silymarin and silibinin inhibit the secretion of pro-angiogenic factors from tumor cells, which are necessary for these cells to recruit the blood supply required for their continued growth.122

In animal research, silibinin was found to exert cancer-fighting effects against an advanced form of human prostate tumor cells, resulting in decreased proliferation and increased cancer-cell apoptosis.123 Silibinin has high bioavailability in the prostate after oral administration, and scientists concluded that it has strong potential to be developed as an intervention for hormone-refractory (castration-resistant) human prostate cancer.121 Silibinin may also work synergistically with the chemotherapy drug doxorubicin to help kill cancer cells, making it a potential candidate for adjuvant therapy.122

However, isosilybin B—a lesser known constituent that comprises no more than 5% of silymarin and is absent from silibinin—appears to be more potent against prostate cancer cells than the other milk thistle substances.125 Scientists reported that other compounds may require much higher concentrations to achieve the same anti-cancer effect elicited by a relatively small dose of isosilybin B.125 It is important to note that some preparations sold as milk thistle extract, silymarin, or silibinin may contain little, or even no, isosilybin B. A typical suggested dosage of a quality standardized milk thistle extract is 750 milligrams daily, taken with or without food.
**15. Gamma-Linolenic Acid (GLA)**

Gamma-linolenic acid (GLA) is an omega-6 essential fatty acid found mostly in plant-based oils. Not all omega-6 fatty acids behave the same: for example, the omega-6s called linoleic acid and arachidonic acid tend to be unhealthy because they promote inflammation; GLA, on the other hand, may serve to reduce inflammation.\(^{126}\) Much of the GLA taken as a supplement is converted to a substance called DGLA (dihomo-gamma-linolenic acid), an omega-6 fatty acid with demonstrated anti-inflammatory effect.\(^{126}\) Similar to the effect of the omega-3 fatty acid eicosapentaenoic acid (EPA), GLA has been found to inhibit the production of urokinase-type plasminogen activator (uPA), a substance believed to play a role in the invasiveness and metastasis of cancer cells.\(^{49}\)

Scientists have also found that GLA metabolites suppress the activity of 5alpha-reductase, an enzyme that converts testosterone to a more potent androgen (5alpha-dihydrotestosterone or DHT) and that is involved in the pathway of prostate cancer.\(^{127}\) It is believed that GLA may also increase the effectiveness of some anticancer drug treatments.\(^{126}\) The suggested GLA dosage for prevention is **300 milligrams daily**, or for adjuvant therapy, **700-900 milligrams daily**, both with food.

**16. Zeaxanthin**

Limited evidence suggests that higher zeaxanthin levels may be protective against prostate cancer.\(^{128}\) In a 2001 study, a scientific team analyzed the plasma levels of various substances in a group of participants that included 65 patients with prostate cancer and 132 cancer-free controls. They found that, relative to those in the lowest quartile, those in the highest quartile of plasma zeaxanthin had a **78%** reduced risk of prostate cancer.\(^{128}\) More study is needed to explore this potential benefit. Appropriate zeaxanthin supplementation amounts for prostate cancer defense have not been determined, but **3.75 milligrams daily** is a current suggested dosage.

**17. Pomegranate**

Use of pomegranate (Punica granatum L. var. spinosa) juice, peel, and oil has been shown to possess anticancer activities, including interference with tumor cell proliferation, cell cycle, invasiveness, and angiogenesis.\(^{129}\) Apoptosis was implicated as a mechanism for this interference with prostate cancer cell proliferation in a laboratory study in which researchers found that pomegranate extract increases expression of a protein that promotes cancer cell death, while decreasing expression of a protein that inhibits cancer cell death.\(^{130}\) Later, in a 2012 study, scientists found that the in vitro cytotoxic activity of an extract of pomegranate against prostate cancer cells was dose-dependent—and they also suggested that this antiproliferative effect followed an apoptosis-dependent pathway.\(^{131}\)

Further clarifying pomegranate’s effects against prostate cancer cells, scientists found evidence of induced beneficial gene expression—inhibiting pro-inflammatory, DNA-related protein nuclear factor kappa B (NF-kB)\(^{132}\) and downregulating production of cancer-stimulating androgen receptors in prostate cells.\(^{133}\) The suggested dosage for prostate cancer prevention is **80-120 milligrams daily** (of punicalagins), and for adjuvant cancer therapy, **280-375 milligrams daily** (of punicalagins), with or without food.
18. Saw Palmetto

Saw palmetto (Serenoa repens or Sabal serrulata) is now one of the most widely used phytotherapies for BPH (benign prostatic hyperplasia) in the US, a condition characterized by an enlarged prostate gland. However, evidence has been emerging that saw palmetto also has biological activity in prostate cancer cells and may defend against prostate cancer. For instance, a saw palmetto extract was shown to inhibit the activity of 5alpha-reductase, an enzyme that converts testosterone to the most potent androgen and that is involved in the pathway of prostate cancer. Saw palmetto also appears to have anti-inflammatory properties and—crucially—a tendency to promote apoptosis in prostate cancer cells.

In one study, researchers described how they used saw palmetto extract to slow the growth of prostate cancer cells in vitro. This growth-inhibitory effect was more potent on prostate cancer cells than on other cancer cell lines on which they tested saw palmetto. One new mechanism identified by this group of scientists was the saw palmetto-induced reduction in the expression of cyclooxygenase-2 (COX-2) in prostate cancer cells. Cancer cells often use COX-2 as biological fuel to hyperproliferate, and as the researchers presenting this report concluded, “We hypothesize that COX-2 inhibition induced by saw palmetto berry extract may provide an important basis for potential chemopreventative action.” A typical suggested dose of saw palmetto is 320 milligrams daily.

19. Resveratrol

By working through over a dozen anticancer mechanisms and selectively targeting cancer cells, resveratrol inhibits prostate cancer at multiple stages of development. This potent compound, found in grapes and other plants, was first isolated in 1940 and is now viewed as a potential defense against this disease. In a study that examined the effect of various polyphenols on different types of prostate cancer cells, scientists concluded that resveratrol was the most potent against advanced prostate cancer cells.

Resveratrol has the ability to modulate the activity of estrogen and testosterone at both the cellular (receptor) and molecular (genetic) levels. In fact, after examining its effects on hormone-responsive genes in prostate cancer cells, researchers concluded that, “Resveratrol may be a useful chemopreventive/chemotherapeutic agent for prostate cancer.” Also, resveratrol reverses increases in PSA in cancer cells. For example, in one study, four days of resveratrol treatment resulted in an 80% reduction in PSA levels in prostate cancer cells. Resveratrol also modulates growth factors, protects DNA, blocks cancer-causing chemicals and radiation, and fights free radicals and inflammation. The same anticancer gene activated by non-steroidal anti-inflammatory drugs (NSAIDs) demonstrates enhanced expression by resveratrol.

Using a DNA microarray—a scientific research tool that simultaneously examines how particular phytocompounds affect thousands of genes—scientists found that resveratrol exerts a striking effect on cancer-related genes. Among other things, resveratrol activates tumor suppressor genes, other genes that destroy cancer cells, and genes that control the cell cycle—while suppressing genes that allow cancer cells to communicate with one another. This ability to get inside cancer cells and activate or deactivate genes is a powerful weapon against cancer growth—especially since resveratrol exerts its effects without toxicity. Many resveratrol supplements on the market are diluted. For pure resveratrol, the suggested dosage is 20-250 milligrams a day, taken with or without food.

20. Supplemental Lignans

Many different plant sources provide rich sources of lignans—and this may partially explain why men who eat healthier diets enjoy sharply reduced rates of prostate cancer. Lignan molecules are involved in plant defense mechanisms. But experimental evidence suggests that dietary lignans also offer humans significant protection against tumors in a variety of organs—including tumors of the prostate. In fact, researchers found that men with higher blood levels of lignans have the lowest incidence of prostate cancer. Bacteria in the intestines convert dietary and supplemental lignans into mammalian lignan compounds called enterolactones, which enter the bloodstream.

Findings from human, animal, and in vitro studies indicate that enterolactones protect against hormone-dependent cancers. Tyrosine kinases are activated in metastatic prostate cancer cells, and enterolactones help to inhibit the tyrosine kinase enzyme. Enterolactones have been shown to inhibit 5alpha-reductase, an enzyme that converts testosterone to a...
more potent androgen. Anti-angiogenesis effects and cancer-cell apoptosis were found to be enhanced by enterolactones in animal models of hormone-related cancers, including prostate cancer. Enterolactone also functions via several mechanisms to reduce estrogen input to cells and has been shown in a number of studies to be a factor in the development of benign prostate enlargement and prostate cancer.

A dosage of 20-50 milligrams daily of lignans is suggested to defend against prostate cancer. For adjuvant prostate cancer support, 75-125 milligrams daily is suggested.

21. Vitamin K

The anti-tumor potential of vitamin K has been a part of scientific research since 1947. Researchers have observed tumor cell destruction in prostate cancer patients following supplementation with a combination of vitamin C and vitamin K3, the synthetic form of vitamin K. (This same combination was later developed into the prostate cancer drug Apatone®, which has shown similar results.)

Subsequently, a study that followed 11,319 men for an average of 8.6 years found that those with the highest intake of vitamin K2 were 63% less likely to develop advanced prostate cancer. The same research team found no effect on prostate cancer from vitamin K1 supplementation. Optimum prostate cancer prevention dosages for vitamin K2 are not known, but typically suggested daily dosages are 1,000 micrograms for the menaquinone-4 form of K2 (MK-4) and 200 micrograms for the menaquinone-7 (MK-7) form.

22. Beta-Sitosterol

A plant fat and phytosterol known as beta-sitosterol, used in several European prostate drugs, has been found to block the growth of prostate cancer cells. A study on an androgen-dependent line of prostate cancer cells showed that beta-sitosterol decreased cancer cell growth by 24% and increased apoptosis four-fold. These findings correlated with a 50% increase in production of ceramide, an important cell membrane component believed to induce apoptosis.

In another study, an androgen-dependent line of human prostate cancer cells (PC-3 cell line) was implanted in mice, and scientists compared both the in vivo and in vitro effects of a 2% mixture of beta-sitosterol with those of a 2% mixture of cholesterol on these cells. Compared to controls, beta-sitosterol, as well as another phytosterol known as campesterol, inhibited growth of the prostate cancer cells by 70% and 14%, respectively. By contrast, the cholesterol mixture increased cell growth by 18%. Various other parameters were also measured.

For example, the phytosterol mixtures inhibited the invasion of the prostate cancer cells into Matrigel-coated membranes—a measure of cancer invasiveness—by 78%, compared to controls, while the cholesterol mixture increased invasiveness by 43%. Also, migration of the prostate tumor cells through 8-micron pore membranes—a measure of tumor motility—was reduced by 60-93% when they were in the phytosterol mixtures, but it was increased by 67% when in the cholesterol. In a measure of adhesive-ness and ability to form tumor clumps, phytosterol supplementation reduced the binding of these cancer cells to laminin by 15-38% and to fibronectin by 23%, while cholesterol increased cell-binding to type IV collagen by 36%. The research team concluded that—indirectly in vivo as a dietary supplement, and directly in vitro in tissue culture media—phytosterols inhibited the growth and metastasis of these (PC-3) prostate cancer cells. Beta-sitosterol, however, was determined to be much more effective than campesterol in offering this protection in most parameters assessed.

In later research on the mechanism involved, scientists determined that phytosterols such as beta-sitosterol may induce the inhibition of tumor growth by stimulating apoptosis and arresting cells at different locations in the cell cycle, and that this may involve alterations in reactive oxygen species and production of prostaglandin. A suggested phytosterol dosage is 169 milligrams twice daily with or without food.
23. Apigenin

In studies on human cancer cells, scientists observed that the vegetable extract apigenin inhibits angiogenesis and cell proliferation. These effects were confirmed in an animal experiment in which scientists transplanted an androgen-dependent line of human prostate cancer cells into mice bred to serve as a model for tumor growth conditions. A liquid suspension containing either apigenin or placebo was given to the mice daily, via a gastric tube, for eight or ten weeks. Administering apigenin to mice—beginning either two weeks before, or two weeks after, inoculation with the cells—inhibited the volume of prostate cancer cells in a dose-dependent manner by as much as 59% and 53%, respectively. Induction of apoptosis in the tumor xenografts was observed. In the same study, exposure of prostate cancer cells to apigenin in a culture for as little as 24 hours appeared to inhibit cell cycle progression by nearly 69%.

Scientists believe these effects may result from apigenin’s modulation of the IGF (insulin-like growth factors) axis, which plays signaling roles in cell proliferation and cell death. Later research demonstrated that apigenin also inhibits motility and invasiveness of prostate carcinoma cells. The importance of supplementation for prostate protection is reflected in the fact that Americans typically consume only 13 milligrams of flavonoids (including flavones like apigenin) daily, however a suggested apigenin preventive dosage is 25-50 milligrams daily, and adjuvant dosage for prostate cancer patients may exceed 100 milligrams daily.

24. Ginger (Zingiber officinale)

A study reported in 2013 demonstrated that ginger phytochemicals work synergistically to inhibit the proliferation of human prostate cancer cells (PC-3 cell line). In past research, ginger showed anti-inflammatory, antioxidant, and antiproliferative activities, suggesting a promising role as a chemopreventive agent. Then, a 2012 study became the first report to clearly demonstrate the anticancer activity of orally taken, whole ginger extract for the therapeutic management of prostate cancer. This breakthrough research found that ginger resulted in growth inhibition, cell-cycle arrest, and induced caspase-dependent intrinsic apoptosis in prostate cancer cells. In vivo studies by this team showed that—without any detectable toxicity—ginger significantly inhibited tumor growth in xenografts of a line of prostate cancer cells (PC3) subcutaneously implanted in nude mice.

Specifically, the scientific team orally fed a solution containing ginger extract to the tumor-implanted mice for eight weeks. Daily measurements of tumor volume were performed. Tumors in control mice that received a placebo solution showed unrestricted growth. But tumors in mice that received the ginger extract solution showed a time-dependent inhibition of growth over the eight-week period. Remarkably, the tumor burden in the ginger group was reduced by about 56% after just eight weeks of feeding.

Tumor tissue from ginger extract-treated mice showed a reduced proliferation index and “widespread apoptosis” compared with controls. Ginger treatment was well tolerated, and the test mice maintained normal weight gain and showed no signs of discomfort during the treatment regimen. Most importantly, orally taken ginger extract did not exert any detectable toxicity in normal, rapidly dividing tissues such as the gut and bone marrow.

Although further research is urgently needed, this study suggests that ginger extract has anticancer effects against human prostate cancer cells. No dosage for this purpose has been determined, but the study team performed allometric scaling calculations to extrapolate the mice dosage to humans. The human equivalent dose of ginger extract was found to be approximately 567 milligrams daily for a 154-pound (70 kilogram) human adult. This may be viewed as an adjuvant therapy dosage, and an appropriate preventive dosage would be significantly less.
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25. Inositol Hexaphosphate (IP6)

Inositol hexaphosphate, or IP6, is a phytochemical found in cereals, soy, legumes, and other fiber-rich foods. Building on earlier in vitro research showing that IP6 strongly inhibits growth and induces differentiation of human prostate cancer cells (PC-3 cells), scientists designed an animal study. They injected mice with a line of human prostate cancer cells (DU145 cells) and then gave them either normal drinking water or water that included 1% or 2% IP6 for 12 weeks. The hormone-refractory (castration-resistant) prostate cancer growth was reduced 47% in the 1% IP6-solution mice and reduced 66% in the 2% IP6-solution mice, compared to littermates without the IP6-enriched drinking water diet.

Then, in 2013, scientists designed an IP6 experiment on TRAMP mice, which are genetically modified to develop metastatic prostate cancer. For 24 weeks, mice with prostate cancer were given drinking water that was 0%, 1%, 2%, or 4% IP6. The study team periodically conducted magnetic resonance imaging (MRI) tests on each mouse prostate to assess prostate volume and tumor vascularity. The animals that received higher concentrations of IP6 showed a "profound" reduction in prostate tumor size, due in part to the compound's antiangiogenic effect (the ability of the compound to reduce new blood vessel formation). The researchers discovered a decrease in a glucose transporter protein, known as GLUT-4, in the prostates of IP6-treated mice, and observed that IP6 decreased glucose metabolism and membrane phospholipid synthesis—meaning there was substantial energy deprivation with the tumor itself. This demonstrates "a practical and translational potential of IP6 treatment in suppressing growth and progression of prostate cancer in humans."

26. N-Acetylcysteine (NAC)

N-acetylcysteine, or NAC, is a metabolite of the amino acid cysteine, which is found in many protein-containing foods. It is used both as a prescription drug and a dietary supplement. As a drug, it is given orally to treat acetaminophen overdose; as a supplement, it is used as an antioxidant and to promote metabolism of glutathione, a potent endogenous antioxidant. Research now indicates it can inhibit growth and block the metastasis of prostate cancer. In an in vitro study, researchers found that NAC significantly inhibited androgen-independent prostate carcinoma cells (PC-3 cells) in a dose- and time-dependent manner—suggesting a potent antiproliferative effect and the promise that NAC may be of benefit in the management of prostate cancer.

Scientists then conducted another lab study to assess the effect of NAC on the metastasis of human prostate cancer cells. They found that NAC inhibited the growth, migration, and invasion of two cell lines (DU145 and PC3 cells). Also, NAC significantly reduced the ability of the prostate cancer cells to attach themselves (to collagen IV-coated surfaces). Inhibition occurred in both cell lines. The team concluded that NAC has high potential to attenuate migration of human prostate cancer cells and to suppress the growth of primary and secondary tumors—and they suggested NAC may represent an affordable and low-toxicity, adjuvant-therapy option for prostate cancer. Dosages of 600 milligrams daily are typical, but higher dosages may be needed for adjuvant cancer therapy.
27. Quercetin

Quercetin is a flavonoid found in a broad range of fruits and vegetables.197 Lab research has suggested that quercetin inhibits prostate cancer development. Scientists found that quercetin produces a 69% reduction in the growth of highly aggressive prostate cancer cells, a greater than 50% upregulation of tumor-suppressor genes, and a 61-100% downregulation of cancer-promoting oncogenes.197 A study suggested that quercetin works partially by blocking the androgen receptors used to sustain growth by prostate cancer cells—potentially preventing these cells from forming tumors.198 Another quercetin anticancer mechanism was revealed in a study on human prostate cancer (PC3) cells. Quercetin induced the mitochondrial apoptotic signaling pathway and endoplasmic reticulum stress, triggering DNA damage and apoptotic death in these cells.199 Other research confirmed that quercetin inhibits the migration and invasiveness of prostate cancer cells.200 A suggested preventive dosage is 500 milligrams daily and an adjuvant prostate cancer dosage is 1,000-3,000 milligrams daily. (The lower dosage of 500 milligrams daily is currently being tested in a double-blind, human clinical trial on the effect of quercetin on the rate of increase in PSA and on the incidence of prostate cancer, but these results are not expected to be available until 2014.201)

28. Reishi

Constituents called triterpenes in the fungus Ganoderma lucidum, better known as reishi mushroom, provide important anti-inflammatory and anti-proliferative effects that play a role in cancer.202 These mechanisms, combined with the polysaccharides and other components in reishi, can inhibit cancer—including prostate cancer cells.203,204 While reishi has been heavily studied for its ability to enhance immunity, some scientists adopted a novel approach to researching potential effects of fungi against prostate cancer. They evaluated the ability of various fungus extracts to act from within the cell to interfere with the androgen receptor and thus, inhibit prostate cancer growth.203,204 These researchers investigated over 200 fungus extracts for their anti-androgenic activity—and of these, G. lucidum (reishi) was one of two mushrooms selected for further investigation.204 This extract also blocked cell proliferation and decreased cancer cell viability.204 Reishi inhibited androgen-sensitive, human prostate adenocarcinoma cells (LNCaP cells).203 The published report concluded that, “G. lucidum extracts have profound activity against LNCaP cells that merits further investigation as a potential therapeutic agent for the treatment of prostate cancer.”203 A suggested preventive dosage of reishi extract is 980 milligrams daily (standardized to contain 13.5% polysaccharides and 6% triterpenes). For adjuvant support in prostate cancer, dosages range from 980 up to 3,000 milligrams daily (standardized to contain 13.5% polysaccharides and 6% triterpenes).

29. 5-Loxin®

Aging humans are at increased risk of health complications and mortality via the upregulation of a proinflammatory enzyme called 5-lipoxygenase, or 5-LOX.205 The 5-LOX enzyme generates a cascade of dangerous inflammatory effects throughout the body—which results in increased vulnerability of the organs to disease and functional deficits, particularly as the aging process progresses.205,206 This enzyme stimulates the manufacture of pro-inflammatory molecules called leukotrienes, which are linked in abundant research to numerous age-related diseases—including cancer.205,207-210 Compounds in the flowering plant genus Boswellia—beta-boswellic acid, keto-beta-boswellic acid, and acetyl-keto-beta-boswellic acid (AKBA)—were shown to induce apoptosis in cancer cells.211 But a purified extract of Boswellia has been specifically shown to selectively inhibit the 5-LOX enzyme.212-214 This purified extract—5-Loxin®—is standardized for AKBA content and protects against inflammatory diseases, including prostate cancer, through several mechanisms. For example, virtually all human cancer cell lines, including prostate cancer cells, induce production of a protein-degrading enzyme called matrix metalloproteinase (MMP), which cancer cells employ to tear apart containment structures within the prostate gland that would normally encase them. This allows the prostate cancer cells to break through healthy prostate tissue and metastasize.215 However, 5-Loxin® has been shown to prevent expression of MMP—inhibiting the spread of prostate cancer cells. Prostate cancer cells also use adhesion molecules called VCAM-1 and ICAM-1—which are directly involved in inflammatory processes—to facilitate their spread throughout the body. 5-Loxin® was shown to prevent the upregulation of these adhesion
A delicate balance of estrogens is crucially important for men’s health as well as women’s. In a study that examined the ratio of estrogen metabolites relative to prostate cancer risk, elevated levels of the more active metabolite, 16-hydroxyestrone, were linked with an increased risk of prostate cancer.\(^{219}\)

Cruciferous vegetables such as watercress are very rich in the compounds *indole-3-carbinol* (I3C) and *3,3’-diindolylmethane* (DIM), which beneficially modulate estrogen metabolism—correlating with a reduced risk of prostate\(^{220-222}\) cancer.

The constituents in watercress were also found to induce phase I and phase II liver enzymes, providing detoxification support that could explain their ability to inhibit the cancer-provoking effects of a variety of chemical compounds.\(^{223}\) The suggested dosage for watercress extract is **50-100 milligrams daily**, taken with or without food.

### 31. Grapeseed

Grapeseed extract contains a mixture of phenolic compounds including flavonoids, anthocyanins, and stilbene compounds such as resveratrol.\(^{224}\) Emerging research suggests it may be a chemopreventive agent.\(^{225,226}\) Several investigators reported a reduction or delay of prostate tumor incidence when male animals were fed grapeseed extract.\(^{227}\) Also, grapeseed proanthocyanidins inhibited human prostate carcinoma cells in lab culture.\(^{228}\) However, it wasn’t until 2011 that scientists investigated the association of long-term grapeseed supplementation with prostate cancer risk in human males.\(^{226}\)

In a 2011 prostate cancer study of more than 35,000 men aged 50 to 76, researchers found that, compared to non-users, men who supplemented with any amount of grapeseed extract reduced their risk of prostate cancer by **41%**.\(^{226}\) However, men with a high 10-year average use of grapeseed supplements experienced a remarkable **62%** reduction in prostate cancer risk.\(^{226}\)

Studies on consumption of wine—which contains grapeseed phenols—found no association with prostate cancer risk.\(^{229-231}\) Also, two large studies on food-based intake of flavonoids, flavonols, and flavones found no association with prostate cancer risk.\(^{232,233}\) Scientists reporting the compelling beneficial results of grapeseed extract supplementation on prostate cancer risk in the 2011 study (above) suggested that, “One explanation for the discrepancy...is that users of grapeseed supplements may be exposed to higher molecules.”\(^{214}\) Also, the process of angiogenesis that feeds blood to developing cancer tumors is tightly linked to chronic inflammation.\(^{216}\) A typical suggested dosage of 5-Loxin\(^{2}\) is **70-100 milligrams daily** with or without food. Individuals with prostate cancer may consider dosages of **170 to 270 milligrams** a day of 5-Loxin.\(^{8}\)

### 30. Watercress Extract

Epidemiological evidence suggests that increased intake of cruciferous vegetables reduces the risk of prostate cancer, prompting scientists to identify the specific compounds responsible for this cancer-preventive effect. They found that a metabolite of *phenethyl isothiocyanate* (PEITC) that is abundant in watercress inhibits the proliferation of prostate cancer cells and their ability to form tumors.\(^{217}\) And watercress is the richest source of a glucosinolate known as nasturtiin—which is transformed into PEITC in the digestive tract.\(^{218}\)
doses of these phenolic compounds than they would from their regular diet.” The suggested preventive dosage is **50-100 milligrams daily**, and the suggested adjuvant therapeutic dosage is **300 milligrams daily**.

32. Glycyrrhizin

Glycyrrhizin, a triterpene compound isolated from the roots of licorice has been found to exhibit potent *in vitro* cytotoxic activity against both hormone-dependent (LNCaP), and hormone-independent (DU-145), lines of human prostate cancer. In one study, glycyrrhizin inhibited cell proliferation in these cell lines in a time- and dose-dependent manner. The decreased viability was found to be due to apoptosis. Glycyrrhizin also caused DNA damage in these cell lines in a time-dependent manner. This suggests that this licorice compound has therapeutic potential against prostate cancer, although a recommended dosage has not been determined.

33. Modified Citrus Pectin

Pectin is a highly complex, branched polysaccharide fiber that is present in most plants and is particularly abundant in citrus fruits like oranges, lemons, and grapefruit. Citrus pectin, in its original form, has a limited solubility in water and therefore limited bioavailability to humans. But in its modified form after hydrolysis, a special formulation of modified citrus pectin becomes a unique water-soluble fiber. This modified form has been shown to bind to the important galectin molecules on the surface of cells. Scientists believe that this ability of the modified citrus pectin to adhere to molecules—specifically to the **galectin-3 molecule**—is responsible for its demonstrated ability to inhibit cancer cells. This preventive effect was shown in animal research. For example, oral administration of modified citrus pectin inhibited the *spontaneous* extraprostatic colonization of injected cells from a prostate cancer cell line and in a dose-dependent fashion.

Cancer cells must communicate with one another to invade, colonize, and proliferate in healthy tissue; but this proprietary citrus pectin appears to disrupt this inter-cellular communication, slowing metastasis. The American Cancer Society suggests that modified citrus pectin may “be useful for preventing or slowing the growth of metastatic tumors in very early stages of development.” For instance, **70%** of prostate cancer patients treated orally for 12 months with a modified citrus pectin preparation experienced a slow-down in the rise of *prostate-specific antigen*, or PSA, concentrations in the blood—without side effects. A suggested dosage is **5-15 grams daily**, taken without food.

34. Four-Nutrient Supplement – Pomegranate, Broccoli, Green Tea, and Turmeric

As discussed, inhibiting effects against prostate cancer have been reported in published studies for a number of individual nutrients, including pomegranate extract, broccoli compounds (I3C, DIM, and PEITC), green tea extract, and curcumin (a key compound in turmeric). A recent, double-blind study documented the potency—and possible synergism—of a supplement that combines powders from all four of these food sources.

Patients with a PSA relapse after radiotherapy or surgery for localized prostate cancer were randomized to receive capsules of either placebo or the four-nutrient supplement, three times daily. After six months, the median increase in PSA levels in the supplemented group was only **14.7%**, while the median PSA increase in the placebo group was **78.5%**. A striking **46%** of the supplemented subjects showed PSA levels that were at or below baseline values, compared to only **14%** of the placebo subjects. Among supplemented patients, **92.6%** were able to continue on active surveillance, compared to just **74%** of the placebo patients. There were no statistically significant side effects. This identical formula is now commercially available, though it’s likely that many Life Extension members have already been taking comparable potencies in supplements that contain these specific nutrients.
Summary
This article described a huge number of nutrients that have been shown in published scientific studies to help reduce prostate cancer risk.

These nutrients function via multiple mechanisms to inhibit the development and progression of prostate cancer and/or induce cancer cell apoptosis (cell destruction).

The latest research—including a remarkable, controlled clinical trial—reveals the dramatic effectiveness of combining some of these nutrients in men who failed initial treatment for prostate cancer. This is the kind of controlled study that mainstream doctors look to when assessing the efficacy of a particular therapy.

Aging men have an incredible opportunity to reduce their risk of prostate cancer, and while doing so, protect against most other degenerative diseases as well.

Long-time members of the Life Extension Foundation® should appreciate this voluminous data as they have been taking many of these nutrients over a multi-decade time period.

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

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A NATURAL ARSENAL FOR PROSTATE CANCER PREVENTION


**Curcumin** is the health-promoting trace compound derived from the Indian spice turmeric. But not all turmeric is alike.

The curcumin found in the vast majority of dietary supplements is derived from turmeric that is nutritionally inferior.

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The graphs on this page illustrate that one 400 mg vegetarian capsule per day of Super Bio-Curcumin® supplies the equivalent of 2,500 mg of commercial curcumin supplements.

A bottle containing 60 vegetarian capsules of Super Bio-Curcumin® retails for $38. If a member buys four bottles, the price is reduced to only $26.25 per bottle.

**References**


**CAUTION:** Do not take if you have gallbladder problems or gallstones. If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Scientists have identified specific extracts from cruciferous vegetables—such as broccoli, cauliflower, cabbage and Brussels sprouts—that help maintain healthy hormone metabolite balance. Triple Action Cruciferous Vegetable Extract combines some of these plant extracts into a comprehensive formula for optimal DNA protection. I3C (indole-3-carbinol) and DIM (di-indolyl-methane) favorably modulate estrogen metabolism and induce liver detoxification enzymes to help neutralize potentially harmful estrogen metabolites and xenoestrogens (estrogen-like environmental chemicals).1-4

Extracts of broccoli, watercress, and rosemary provide glucosinolates, isothiocyanates, carnosic acid, and carnosol—bioactive compounds that have a multitude of favorable effects on estrogen metabolism and cell division.5-8 Apigenin, a powerful plant flavonoid found in plants such as parsley and celery, is also added to the formula to boost cell protection,9 while 25 mg of a natural source of benzyl isothiocyanate (BITC), are included to maintain cell health.10

Consumers should be aware that while consumption of cruciferous vegetables is highly recommended, the cooking process depletes many of the beneficial compounds such as I3C.

For those weighing less than 160 pounds, just one capsule a day provides optimal potencies. Those weighing over 160 pounds should consider taking two capsules a day. A bottle containing 60 vegetarian capsules of Triple Action Cruciferous Vegetable Extract retails for $24. If a member buys four bottles, the price is reduced to $16.50 per bottle.

To order Triple Action Cruciferous Vegetable Extract, 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.

REFERENCES

Those who want to obtain the benefits of trans-resveratrol can order Triple Action Cruciferous Vegetable Extract with Resveratrol. Each capsule provides 20 mg of trans-resveratrol in addition to the vegetable extracts and retails for $32 per 60-capsule bottle. When a member buys four bottles, the price is reduced to $22.20 per bottle.

CRUCIFEROUS Vegetable Extracts in Convenient Capsules

Triple Action Cruciferous Vegetable Extract provides the following concentrates in just one vegetarian capsule:

- Broccoli Extract 400 mg [standardized to 4% glucosinolates (16 mg)]
- Watercress 4:1 extract 50 mg
- Indole-3-Carbinol (I3C) 80 mg
- Rosemary Extract 50 mg
- Cat’s Claw Extract 50 mg
- Cabbage Extract 25 mg
- DIM (di-indolyl-methane) 14 mg
- Apigenin 25 mg

Item # 01468

Item # 01469
Study after study confirms the vital importance of maintaining optimal levels of vitamin D. Research often indicates that a blood level between 50–80 ng/mL of 25-hydroxyvitamin D is ideal. Because people have individual requirements, Life Extension® has created a large selection of vitamin D supplements to ensure that you achieve your vitamin D3 goals.

Keep in mind that you may already be getting 1,000-3,000 IU of vitamin D in your multi-nutrient formulas. Vitamin D is now available in superior absorbing softgels. A recent study demonstrated that the use of one 5,000 IU vitamin D softgel daily resulted in a near 30% increase in vitamin D levels in just 60 days.

**VITAMIN D3 5,000 IU**
60 softgels
Retail: $11
Four-bottle Member Price: $7.43 ea.
For those already obtaining 1,000-3,000 IU of vitamin D in their multi-nutrient formulas, this 5,000 IU potency is what many need to achieve optimal vitamin D blood levels. Item # 01713

**VITAMIN D3 7,000 IU**
60 softgels
Retail: $14
Four-bottle Member Price: $9.45 ea.
Some individuals (such as those weighing more than 180 pounds) may require higher potencies of vitamin D. When combined with 1,000-3,000 IU obtained from multi-nutrient formulas, this 7,000 IU vitamin D3 softgel should enable these individuals to attain 25-hydroxyvitamin D blood levels above the desired range of 50 ng/mL. Item # 01718

**VITAMIN D3 LIQUID**
2,000 IU (Natural mint flavor)
1 ounce
Retail: $28
Four-bottle Member Price: $18.75 ea.
For those rare individuals who have difficulty absorbing enough vitamin D3 from softgels, this liquid of vitamin D can be used. Item # 01732

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

*If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner.*

To order any of these high-potency vitamin D3 supplements, call 1-800-544-4440 or visit www.LifeExtension.com
Hosted by Michael A. Smith, M.D., Senior Health Scientist for Life Extension®, *The Issue Is Your Health* brings the pages of *Life Extension Magazine* to life every month with informative and thought-provoking conversation.

High-profile guests such as Dr. Ruth Westheimer and Suzanne Somers join Dr. Mike to discuss pioneering research, global health news, and other issues vital to your well-being.

You’ll find this lively video magazine to be smart and stimulating. And in each issue, you’ll learn something new about how to live a healthier, longer life. Be sure to watch it at [www.lef.org/videomag](http://www.lef.org/videomag).

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After getting feedback from members like you, we re-designed the Life Extension® site to provide a better, friendlier user experience. You’ll find it easier … and faster … than ever before to get the information you need to live a long, healthy, active life. Visit us today at [www.lef.org](http://www.lef.org).
There are now a number of diagnostic tests to identify early stage prostate cancer and then monitor the success or failure of a wide range of treatment options.

This article succinctly describes conventional prostate gland diagnostic tests along with those that mainstream medicine often overlooks, to the detriment of their patients. All of these tests, however, are commercially available.
TESTS
1. PSA (Prostate-Specific Antigen)

Perhaps the greatest breakthrough in the detection and management of prostate cancer was the approval of the prostate-specific antigen (PSA) blood test in 1986, but it was only approved for men already diagnosed with prostate cancer. It wasn't until 1994 that the FDA approved the PSA test as a prostate cancer screening test for all men. Prostate-specific antigen is a protein produced by the cells of the prostate gland, including both cancerous cells as well as cells that are benign. Since very little PSA escapes into the bloodstream from a healthy prostate, an elevated PSA level in the blood indicates an abnormal condition of the prostate gland—which can be either benign or malignant. PSA test results can be used both to detect potential prostate problems and to follow the progress of prostate cancer therapy.

Because tumor growth is essentially exponential, with one cell dividing into two, two to four, four to eight, and so on, a tumor cell product such as PSA can reflect such exponential growth—measuring the time it takes for PSA to double (PSA doubling time, or PSADT). Also, the PSA rate of rise (PSA velocity), although not a more specific marker, may have value in prostate cancer prognosis—because men with prostate cancer whose PSA level increased by more than 2.0 ng/mL during the year before their diagnosis showed a higher risk of death from prostate cancer. Additionally, though not an absolute criteria for or against malignancy, PSA velocity can serve as a gauge regarding the likelihood of a malignant condition. A rising PSA velocity in excess of .75 ng/mL/year relates to an increased probability of a malignant condition.

The reference interval provided by most conventional laboratories for the PSA test is 0.00-4.00 nanograms per milliliter (ng/mL). Conventional reference ranges suggest that PSA levels under 4.0 ng/mL are normal, but any reading over 2.0 ng/mL can indicate unhealthy activity, such as prostatitis, benign prostate hypertrophy, or prostate cancer. If PSA readings begin to elevate, there are interventions that can reduce or
stabilize the production of PSA, shutting down a mechanism used by cancer cells to escape their confinement within the prostate gland.\(^5\) PSA readings can increase immediately after ejaculation, returning slowly to baseline levels within 24-48 hours.\(^6,^7\)

Below are the percentage of PSA ranges and what they represent as far as prostate cancer risk. Note that when the percentage of free PSA is high (over 20%), this means the risk of prostate cancer is low, whereas a low percentage of free PSA (under 11% indicates high risk).

### Chart of PSA Ranges with Succinct Suggestions

<table>
<thead>
<tr>
<th>PSA (ng/mL)</th>
<th>Concise Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-1.00%</td>
<td>Optimal</td>
</tr>
<tr>
<td>1.01-2.40%</td>
<td>Initiate measures to support prostate health and have digital rectal exam performed</td>
</tr>
<tr>
<td>2.51-4.00%</td>
<td>Moderate concern–assess PSA velocity–have digital rectal exam–consider other tests.</td>
</tr>
<tr>
<td>&gt;4.00%</td>
<td>Too high–additional diagnostics recommended</td>
</tr>
</tbody>
</table>

### 2. Free PSA

Free PSA is a newer evaluation for prostate health. Most PSA in the blood is bound to serum proteins, but a small amount is not protein-bound and is called free PSA.\(^2,^8\) In men with prostate cancer, the ratio of free (unbound) PSA to total PSA is decreased.\(^2\) The **free PSA** test measures the percentage of free PSA relative to the total amount.\(^9\) The lower the ratio, the greater the probability of prostate cancer. Measuring free PSA may help eliminate unnecessary biopsies.\(^8\) Free PSA readings increase immediately after ejaculation, returning slowly to baseline levels within about 24 hours.\(^6\) Although not used as an initial screening test, a lower percentage of free PSA might mean your doctor needs to do a further workup.

### PROSTATE CANCER RISK

<table>
<thead>
<tr>
<th>Free PSA%</th>
<th>50-64 Years</th>
<th>65-75 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-10.00%</td>
<td>56%</td>
<td>55%</td>
</tr>
<tr>
<td>10.01-15.00%</td>
<td>24%</td>
<td>35%</td>
</tr>
<tr>
<td>15.01-20.00%</td>
<td>17%</td>
<td>23%</td>
</tr>
<tr>
<td>20.01-25.00%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>Over 25%</td>
<td>5%</td>
<td>9%</td>
</tr>
</tbody>
</table>

### 3. PCA3 Urine

PCA3 is a molecular diagnostic test performed on urine rather than blood and detects mRNA that is excreted into the urethra via the epithelial cells that line the prostatic ducts.\(^10\) Prostate cancer cells tend to produce this compound far more than normal cells do.\(^10\) The PCA3 urine test has to be done in a urologist’s, or other doctor’s, office, because it requires a digital rectal massage just prior to collection of the urine.\(^11\)

PCA3 testing is most useful when repeated over a period of time to monitor for changes in the observed value. In general, a PCA3 score of 35 is considered the optimal cut-off. A score of greater than 35 reflects an increased probability of a positive biopsy. A score of less than 35 reflects a decreased probability of a positive biopsy.

### 4. 25-Hydroxy Vitamin D

Research points to a connection between vitamin D levels and cancer.\(^12,^13\) Experimental studies indicate that low levels of vitamin D increase prostate cancer risk.\(^14\) And further evidence shows that the active form of vitamin D promotes differentiation and inhibits proliferation, invasiveness, and metastasis of human prostate cancer cells.\(^14,^15\) Detecting deficient levels allows you and your physician to implement vitamin D supplementation to help avert illnesses associated with inadequate vitamin D levels. For this nutrient, individualized dosing is of particular importance, and the only way to accomplish this is through vitamin D blood testing. Although conventional laboratory reference ranges list a reference interval of 30-100 ng/mL, Life Extension supports maintaining vitamin D in the 50-80 ng/mL range.\(^16\)
5. Prolactin

Prolactin, a peptide hormone largely secreted by the anterior pituitary gland, has typically remained restricted to the fields of lactation and infertility. However, researchers discovered that prolactin plays a major role in the differentiation and development of the prostate gland. Both malignant and healthy prostates produce prolactin. Prostatic fluids from patients with cancer also have higher prolactin levels than controls. In vitro, prolactin induces proliferation and antagonizes apoptosis in prostate organ culture and in some tumor cell lines. Increased levels of prolactin have significant stimulatory action on the prostate and on prostate ductal development and may lead to hyperplastic growth, independent of elevations in circulating androgen levels.

Labcorp normal reference range - Male: 4.0-15.2 ng/mL
Optimal for Prostate Cancer - <5 ng/mL

6. DRE (Digital Rectal Exam)

Men can easily be tested for palpable prostate abnormalities with a digital rectal exam (DRE), a simple test that provides a lot of information. It gives the physician a sense of the prostate gland volume. The bigger the prostate, the more PSA the gland is entitled to make without indicating a potential problem. A basic rule is that the prostate gland volume multiplied by the amount of PSA produced per unit of volume in benign prostate tissue is 0.067 ng. This means that a 50-year-old man with a normal size prostate of 30 grams (or cubic centimeters) would therefore be entitled to make approximately 2 ng of PSA. If such a man has a PSA of 4.0 ng/mL, it would indicate an excess of about 2 ng of PSA and the need for further investigation to rule out prostate cancer.

In addition to estimating prostate gland volume and calculating the benign cellular contribution to the total PSA value, the DRE can also aid in finding hard nodules or other evidence of disease. Palpable (able to be felt) abnormalities of the prostate gland relate to tumor volume, also called tumor burden. In the years before routine testing with PSA, most prostate cancers were already palpable via DRE by the time of diagnosis. Today, close to 70% of prostate cancers newly diagnosed in the US are no longer associated with palpable disease. This shows the value of PSA screening in allowing an earlier diagnosis of prostate cancer — before the cancer has had a chance to get bulkier and manifest itself as a palpable disease, known as a T2 disease. Most American men when first diagnosed with prostate cancer have non-palpable, or T1, prostate cancer.
7. Blood Hormone Profile

A comprehensive blood test for specific hormone levels is useful. In addition to the free and total testosterone levels covered earlier, a complete blood test should include levels of estradiol, DHT (dihydrotestosterone), pregnenolone, DHEA-S (dehydroepiandrosterone sulfate), FSH (follicle-stimulating hormone), LH (luteinizing hormone), and possibly, IGF-1 (insulin-like growth factor 1). DHT plays a role in the development and exacerbation of benign prostatic hyperplasia, as well as prostate cancer.20 FSH (follicle-stimulating hormone) and LH (luteinizing hormone) regulate the reproductive processes of the body, and in aging men, a rise in FSH and LH can be indicative of andropause.21,22 Studies have shown that increased levels of IGF promote cancer growth and confer resistance to conventional treatments (chemotherapy and radiation).23,24

8. PAP (Prostatic Acid Phosphatase) Test

The PAP test is a simple blood test, used to measure the amount of an enzyme—called prostatic acid phosphatase (PAP)—that is produced by prostate epithelial cells and is abundant in seminal fluid.25 Higher levels of PAP are associated with prostate cancer.25 PAP determination, in conjunction with PSA measurements, is useful in assessing the prognosis of prostate cancer. It is an important test, because it allows identification of prostate cancer patients who have an elevation of PAP, but not of PSA. This helps monitor the course of disease and response to treatment.

9. Circulating Tumor Cells Assay

This test provides a measurement of cancer cells that have separated from a solid tumor site and are circulating in the bloodstream.26 Detecting the presence of circulating tumor cells in the blood has clinical usefulness in assessing the disease status and prognosis of metastatic prostate cancer, and is predictive of overall survival.27 Fasting prior to the blood draw is not required.

<table>
<thead>
<tr>
<th>Baseline PAP²</th>
<th>Freedom from prostate cancer recurrence at 5 years after prostate cancer surgery defined as psa&gt;0.2 ng/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.4 U/liter</td>
<td>87%</td>
</tr>
<tr>
<td>0.4-0.5 U/liter</td>
<td>79%</td>
</tr>
<tr>
<td>&gt;0.5 U/liter</td>
<td>63%</td>
</tr>
</tbody>
</table>
1. Transrectal Ultrasound

Transrectal ultrasound creates an image of the organs in the pelvis, and the most common indication is for the evaluation of the prostate gland in men with elevated PSA levels, or with prostatic nodules on a digital rectal exam. Ultrasound clarifies the size of the prostate gland and aids in the distinction between benign prostate conditions and prostate cancer. This type of imaging can also be used to help guide a biopsy of the prostate.

2. Color Doppler Ultrasound

Color Doppler ultrasound is a medical imaging technique that is used to provide visualization of blood flow, using computer processing to add color to the image to greatly clarify what is happening inside the body. An ultrasound transducer is used to beam sound into the area of interest, and it reads the returning sound. When the sound bounces off a moving target such as a blood vessel, the pitch changes as a result of the Doppler effect. The transducer can detect very subtle pitch changes, record them visually, and generate an image showing where blood is flowing, and in what direction. Because a simple grayscale image can be a bit difficult to read, the ultrasound machine assigns different color values, depending on whether blood is moving towards or away from the transducer. In addition to showing the direction of flow, the colors also vary in intensity depending on the velocity of the flow, allowing doctors to also see how quickly the blood is moving.

A color Doppler ultrasound of a patient with a suspected tumor will reveal the precise areas where the velocity of blood flow is changing, mapping out the problem in full color. This type of imaging can map out the tumor’s blood supply to clarify exactly how far the growth has spread. This can have an impact on what treatments are selected, and how surgery and other measures are approached. While color Doppler ultrasound can be done using a transducer on the outside of the body, it can also be used for transrectal procedures, in which the probe is inserted to get a better view.

3. MRI (Magnetic Resonance Imaging)

The MRI has been used for over 30 years for prostate cancer detection and evaluation. In contrast to ultrasound imaging, prostate MRI has superior soft tissue resolution. Magnetic fields are used to locate and characterize prostate cancer. To do so, radiologists use multi-parametric MRI, which includes four different types of MRI sequences. Currently, MRI is used to identify targets for prostate biopsy, and to make a surgical plan for men undergoing robotic prostatectomy. MRI imaging also helps surgeons decide whether to resect or spare the neurovascular bundle and assess surgical difficulty.

4. (Nuclear) Bone Scan

Prostate cancer can cause “hot spots” to appear on a bone scan if the cancer has metastasized to the bone. A bone scan for cancer uses nuclear technology and involves administering a radioactive substance called a tracer to produce gamma radiation that can be picked up by a special camera. The tracer consists of radionuclides that bind to the bone and show up as dark or light spots. After the technician injects the tracer, it usually takes between one and four hours for the radioactive substance to move...
aggressive treatment such as radical prostatectomy or radiation even though there is less than a 3% chance of deadly progression.44 A new test called Oncotype DX is now available to physicians and their patients. It measures the level of expression of 17 genes across four biological pathways to predict prostate cancer aggressiveness.44 Test results are reported as a Genomic Prostate Score (GPS) ranging from 0 to 100; this score is assessed along with other clinical factors to clarify a man’s risk prior to treatment intervention.44 This multi-gene test has been validated using the prostate needle biopsy sample taken before the prostate is removed, thereby providing the opportunity for low risk patients to avoid invasive treatments. According to the principle investigator of the validation study, individual biological information from the Oncotype DX prostate cancer test almost tripled the number of patients who can more confidently consider active surveillance and avoid unnecessary treatment and its potential side effects.44

The advantage of this test for those who choose the comprehensive surveillance program utilized by Life Extension members (which involves the use of several drugs, targeted nutrients, and adherence to healthy dietary patterns) is to provide greater assurance the right course of action is being followed.

For information about the Oncotype DX test, log on to www.genomichealth.com

Prolaris® is another genomic test developed to aid physicians in predicting prostate cancer aggressiveness in conjunction with clinical parameters such as Gleason score and PSA.45

Prolaris® measures prostate cancer tumor biology at the molecular level. By measuring and analyzing the level of expression of genes directly involved with
cancer replication, Prolaris® may be able to more accurately predict disease progression.\textsuperscript{45}

Prolaris® is a tool designed to measure the aggressiveness of a patient’s cancers to better predict and stratify an individual’s relative risk of disease progression within ten years.\textsuperscript{45} It may enable physicians to better define a treatment/monitoring strategy for their patients.

Prolaris® claims to be significantly more prognostic than currently used variables and provides unique additional information that can be combined with other clinical factors in an attempt to make a more accurate prediction of a patient’s cancer aggressiveness and therefore disease progression.\textsuperscript{45}

Prolaris® has been shown to predict clinical progression in four different clinical cohorts, in both pre and post-treatment scenarios.

In the treatment of prostate cancer, Prolaris® is prognostic at the point of diagnosis and in the post-surgery setting.\textsuperscript{45}

At diagnosis, Prolaris® can help to identify patients with less aggressive cancer who may be candidates for active surveillance. In addition, Prolaris® can define patients who appear clinically low-risk but have a more aggressive disease that requires more aggressive treatment.

Prolaris® testing is also well suited for use in post-prostatectomy patients that have higher risk features after surgery to better estimate their risk of disease recurrence and therefore adjust the level of monitoring or add additional therapy.

For more information about Prolaris®, log on to www.myriad.com

Summary

Prostate cancer is the most common malignancy in US men (excluding non-melanoma skin cancer), afflicting one male in every six.\textsuperscript{46,47} A significant percentage of men have underlying prostate cancer without even knowing it.\textsuperscript{48,50}

These men have access to an arsenal of tools for their doctors to diagnose and then monitor the success or failure of various treatment modalities, including “active surveillance” or “watchful waiting.”

As you’ve learned in this issue of \textit{Life Extension}, one does not have to sit back and “watch” their PSA level steadily rise. Nutritional, hormonal, and drug approaches exist to help control early-stage, low-grade prostate tumors. There is data to support the efficacy of some of them as effective adjuvants in men with high-grade tumors as well.\textsuperscript{51-59}


Maintaining healthy, flexible joints is essential to quality of life. Joint stiffness and discomfort can stand in the way of performing even simple everyday tasks.

Most people do not obtain critical nutrients shown to support youthful joint function and mobility.

To meet this urgent need, Life Extension® introduced Krill Healthy Joint Formula, a patent-pending blend of deep-sea whole krill oil sourced in Antarctica, combined with hyaluronic acid and astaxanthin.

In a recent clinical trial involving over 100 maturing individuals, a 55% reduction in joint discomfort was observed in less than three months, with 63% of participants maintaining ease of motion.1

THREE SYNERGISTIC COMPOUNDS FOR SUPERIOR BENEFIT

The data reveals that the fatty acids found in krill oil are particularly effective for joint health.2 These unique fatty acids have been shown to specifically target joint tissue.2,3

Hyaluronic acid occurs naturally in the joints,4 where it acts to lubricate and cushion against repeated physical impacts.5 Because it forms a major component of cartilage and soft tissue,4 it is widely used to promote joint health.4-8

The difficulty has been that hyaluronic acid is a large molecule not well absorbed by the body. When combined with krill oil, it has been shown to reach significantly higher levels in the bloodstream than in standalone form.8

Krill oil is a natural source of the antioxidant carotenoid astaxanthin. Astaxanthin works in multiple ways, including suppression of free radical activity and enhanced mitochondrial function.9 It also maintains krill oil’s molecular stability.

Most commercially available krill oils do not contain significant amounts of astaxanthin because it is nearly eliminated during processing. Krill Healthy Joint Formula is fortified with astaxanthin, for maximum stability and superior benefit.

JUST ONE SOFTGEL DAILY

The suggested daily serving of one Krill Healthy Joint Formula softgel daily supplies 353 mg of this proprietary blend.

A bottle containing 30 softgels of Krill Healthy Joint Formula retails for $32. If a member buys four bottles, the price is reduced to $21.75 per bottle. Just one softgel a day of Krill Healthy Joint Formula duplicates a successful human clinical trial.

References

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

Contains crustacean shellfish (krill).
Licensed from Valensa International.
Zanthin® is a registered trademark of Valensa International, Inc.

Item # 01600

To order Krill Healthy Joint Formula call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
Tender, sensitive joints can limit everyday activities. As you age and continue to put stress on your joints, you can compromise joint cartilage—which exposes small collagen fibers.

Your body’s immune system mistakenly identifies these collagen fibers as “foreign cells.” This triggers an inflammatory response against the collagen-containing cartilage in your own joints. Inflammation and joint discomfort can soon follow.

Data shows that a patented collagen provides targeted support for the immune issues related to joint discomfort.\(^1\)

To meet this urgent need, Life Extension® offers Bio-Collagen with Patented UC-II®—a novel form of undenatured type II collagen from chicken cartilage.

Taken orally, UC-II® travels to the intestinal tract, where it “introduces” the immune system to the same type of collagen molecules found in joint cartilage.

**ADVANCED MOLECULAR STRUCTURE**

Not just any form of collagen will do. Normally, when chicken collagen is processed, its molecular shape is changed. It loses bioactivity and becomes denatured—which researchers found has no beneficial effect\(^1\) on the immune system.

Fortunately, a unique processing technique preserves the correct molecular shape of the collagen—\(^2\) and preserves its bioactivity\(^2\)—producing a form known as undenatured collagen. The result of this innovative process is an undenatured chicken collagen called Bio-Collagen with Patented UC-II®.

**SCIENTIFICALLY VALIDATED**

Scientific studies have found that UC-II® reduced sensitive joint discomfort and eased joint function.\(^1\)\(^6\)\(^–\)\(^10\) One double-blind, placebo-controlled study on patients found that UC-II® provided relief by 33% and decreased joint discomfort scores by a remarkable 40%—in just 90 days!\(^1\)

**CONVENIENT ONE-PER-DAY DOSE**

The suggested daily serving of one capsule of Bio-Collagen with Patented UC-II® supplies 40 mg of UC-II® standardized chicken cartilage.

The retail price of a bottle of 60 capsules of Bio-Collagen with Patented UC-II® is $36. If a member buys four bottles, the price is reduced to $24 per bottle or just $12 a month.

To order Life Extension® Bio-Collagen with Patented UC-II®, call 1-800-544-4440 or visit www.LifeExtension.com

UC-II® is a registered trademark of InterHealth N.I. U.S. Patents 7,846,487; 7,083,820 and EPO patent EP 1435906B1; Canadian patent CA 2459981C; and Japanese patent JP 4800574B2.

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LIMIT THE RELEASE OF GLUCOSE FROM STARCHY FOODS

Hundreds of studies document the importance of protecting against blood glucose surges.¹

What the public doesn’t realize is that a huge source of blood sugar emanates from dietary starch.²,³ This includes bread, pasta, potatoes, and rice. But even so-called healthy carbohydrates such as whole-grain bread and brown rice can induce undesirable glucose spikes.⁴

In a breakthrough development, scientists have shown that an enzyme called transglucosidase converts starches into prebiotic fiber—within your own digestive tract!⁵,⁶ Taking this enzyme with starchy meals helps avoid the flood of glucose into the bloodstream that results from eating carbohydrates.

COMPPELLING HUMAN RESEARCH DATA

Published studies show that transglucosidase limits the amount of SUGAR released from STARCH, especially in the critical after-meal period. It does this by converting dietary starch into a beneficial indigestible prebiotic fiber.⁵,⁶

Transglucosidase has been demonstrated in humans to reduce the level of rapidly digested starch in a carbohydrate food item by 31%.⁷ This helps maintain healthy blood glucose, cholesterol, and insulin levels for those whose levels are already in the normal range.⁸-¹¹

SHIELD AGAINST AFTER-MEAL GLUCOSE SURGES

Each vegetarian capsule of the new GlycemicPro™ Transglucosidase contains a full 450,000 TG (transglucosidase activity units) of trans-glucosidase.

Just one capsule taken with starch-containing meals helps limit the release of sugar from starch. Those who consume a low-starch diet may need to take only one GlycemicPro™ Transglucosidase capsule daily with their starch-containing meal.

A bottle of 60 vegetarian capsules of GlycemicPro™ Transglucosidase retails for $48. If a member buys four bottles, the price is reduced to $31.50 per bottle.

References

Contains soybeans. Contains tree nuts (coconut).

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

GlycemicPro™ Transglucosidase, 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.
COFFEE EXTRACTS FOR THE SKIN

It is now possible to diminish visible signs of facial-skin photoaging—by harnessing the power of coffee compounds.

Facial skin retains its youthful, vibrant glow thanks to a resilient framework of connective tissue formed by the proteins collagen and elastin and water-binding glycosaminoglycans.¹ These molecules make up the skin’s extracellular matrix that supports the suppleness of the skin.¹,²

However, free radicals generated by the pervasive ultraviolet rays of the sun are associated with a normal decline in this extracellular matrix.²,³ Over time, unsightly, tell-tale signs of photoaging may appear—wrinkles, redness, and roughness—especially in the sun-vulnerable regions such as the face.⁴,⁵

Concentrated coffee extracts can target multiple factors involved in facial skin aging.

THE POWER OF TOPICALLY APPLIED COFFEE COMPOUNDS

Scientists have shown that topical application of the highly active coffee compounds supports the natural capacity of the extracellular matrix to replenish connective tissue and restore water-binding molecules.⁶-¹⁰

Topically applied caffeine, for instance, helps support the body’s normal removal of ultraviolet light-damaged keratinocyte cells—the process a healthy body employs to inhibit skin photoaging.⁶

This promotes the appearance of firmer, more youthful-looking facial skin.⁹

IMPACT ON AGING SKIN

Studies have demonstrated the effectiveness of coffee compounds—Coffea arabica seed oil as well as Coffea robusta seed extract, which is known to contain both chlorogenic acid and caffeine—on aging facial skin.

When applied directly to facial skin…

• Arabica seed oil improved skin dryness and promoted the body’s natural production of collagen and elastin.⁶

• Coffea arabica supported improvement of the appearance of wrinkles, redness, and rough texture in a clinical trial—at after just 12 weeks of twice daily application.⁹

• Chlorogenic acid helped reduce the normal redness associated with prolonged ultraviolet exposure.⁷

• Caffeine enhanced the visibility of skin smoothness and promoted a reduction in wrinkle depth—with clinical results seen in only 4 weeks.¹⁰

These coffee extracts have been combined into the new Cosmesis Anti-Aging Rejuvenating Face Cream to help provide support against the visible signs of photoaging. Suggested use is to apply this rejuvenating face cream to clean skin twice a day, morning and night.

A net weight 2 oz jar of Cosmesis Anti-Aging Rejuvenating Face Cream retails for $65. If a member buys two jars, the price is reduced to $42.75 per jar.

References

To order Cosmesis Anti-Aging Rejuvenating Face Cream, call 1-800-544-4440 or visit www.LifeExtension.com
THE STAGGERING TRUTH ABOUT CHOLESTEROL

Dr. Dzugan and his foresighted colleagues have discovered a new fundamental and unifying truth about human aging. They recognize that elevated cholesterol may in fact simply be the result of accumulated errors of physiology throughout a lifetime.

ENORMOUS IMPLICATIONS

If the theories in *The Magic of Cholesterol Numbers* are true, then when humans repair a lifetime of errors of physiology using tailored, *multimodal* therapeutic approaches, they can see truly remarkable results in conditions that otherwise perplex mainstream medicine.

WHAT YOU’LL LEARN

In *The Magic of Cholesterol Numbers*, you’ll gain knowledge about:

- Why mainstream doctors have taken a disastrous approach to cholesterol.
- What the Atherosclerosis – Cholesterol Axis is and why it’s important.
- What the REAL problems created by high and low cholesterol are.
- How cholesterol and steroid hormones are linked.
- What the “Grandmother” of steroids truly is.
- Why there are so many unfavorable misconceptions about estrogen in women.
- How Dr. Dzugan’s cutting edge hypothesis about high cholesterol is changing medicine.
- And much, much more!

*The MAGIC of Cholesterol Numbers*

“This is an absolutely brilliant and very unique book.”

– Emilia Fabian, MD, PhD

To order *The Magic of Cholesterol Numbers*,
call 1-800-544-4440 or visit www.LifeExtension.com

Buy *The Magic of Cholesterol* TODAY and read about the incredible CLINICAL EVIDENCE that proves Dr. Dzugan is revolutionizing medicine.

Item # 33852
Retail price: $29.95
Member price: $22.46
Blood testing provides the ultimate information regarding correctable risk factors that may predispose you to disorders such as cancer, diabetes, cardiovascular disease, and more. Information about general health and nutritional status can also be gained through standard blood analysis. Standing behind the belief that blood testing is an essential component of any program designed to attain optimal health and longevity, Life Extension® offers this innovative and convenient service at a very affordable price. Not only is comprehensive blood testing an important step in safeguarding your health, it is a simple process from virtually anywhere in the United States.

Five Easy Steps:
1. Call 1-800-208-3444 to discuss and place your order with one of our knowledgeable health advisors. (This order form can also be faxed to 1-866-728-1050 or mailed. Online orders can also be placed at www.lifeextension.com.)
2. After your order is placed, you will be mailed either a requisition form to take to your local LabCorp Patient Service Center or a Blood Draw Kit; whichever is applicable (Please note: If a blood draw kit is used, an additional local draw fee may be incurred.)
3. Have your blood drawn.
4. Your blood test results will be sent directly to you by Life Extension.
5. Take the opportunity to discuss the results with one of our knowledgeable health advisors by calling 1-800-226-2370; or review the results with your personal physician.

It’s that simple! Don’t delay—call today!

For Our Local Members:
For those residing in the Ft. Lauderdale, Florida area, blood-draws are also performed at the Life Extension Nutrition Center from 9:00 am to 2:00 pm Monday through Saturday. Simply purchase the blood draw and have it drawn with no wait! Our address is 5990 North Federal Highway, Ft. Lauderdale, FL, 33308-2633.

** 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, requiring a finger stick performed at home.

### Most Popular Panels

#### Life Extension Member Pricing

<table>
<thead>
<tr>
<th>Panel Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMPREHENSIVE PANELS</strong></td>
<td></td>
</tr>
<tr>
<td><strong>MALE LIFE EXTENSION PANEL (LC322582)</strong></td>
<td>$269</td>
</tr>
<tr>
<td>Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests plus 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Homocysteine, Free Testosterone, Total Testosterone, Progesterone, Estradiol, Testosterone, Pregnenolone, Total and Free Testosterone, HDL, TSH, Free T3, Free T4.</td>
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</tr>
<tr>
<td><strong>MALE WEIGHT LOSS PANEL (LC07LM)</strong></td>
<td>$299</td>
</tr>
<tr>
<td>Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests plus 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Insulin, Total Testosterone, Progesterone, Estradiol, Testosterone, Free T3, Free T4, TSH.</td>
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<tr>
<td><strong>FEMALE LIFE EXTENSION PANEL (LC322535)</strong></td>
<td>$269</td>
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<tr>
<td>Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests plus 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Homocysteine, Free Testosterone, Total Testosterone, Progesterone, Estradiol, Testosterone, Pregnenolone, Total and Free Testosterone, HDL, TSH, Free T3, Free T4.</td>
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<tr>
<td><strong>FEMALE WEIGHT LOSS PANEL (LC07LF)</strong></td>
<td>$299</td>
</tr>
<tr>
<td>Chemistry Profile includes glucose, cholesterol, LDL, HDL, triglycerides, liver and-kidney function tests plus 20 additional tests. CBC includes immune (white) cell count, red blood cell count and platelet count. Also includes: C-Reactive Protein, Insulin, Total Testosterone, Progesterone, Estradiol, Testosterone, Free T3, Free T4, TSH.</td>
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<tr>
<td><strong>MALE HORMONE ADD-ON PANEL (LCADD)</strong></td>
<td>$155</td>
</tr>
<tr>
<td>Pregnenolone and Dihydrotestosterone (DHT) To provide an even more in-depth analysis of a man’s hormone status, Life Extension has created this panel as an addition to the Male Life Extension Panel. This panel provides valuable information about a testosterone metabolite that can affect the prostate, and the mother hormone that acts as a precursor to all other hormones.</td>
<td></td>
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<tr>
<td><strong>FEMALE HORMONE ADD-ON PANEL (LCADD)</strong></td>
<td>$125</td>
</tr>
<tr>
<td>Pregnenolone and Total Estrogens To provide an even more in-depth analysis of a woman’s hormone status, Life Extension has created this panel as an addition to the Female Life Extension Panel. This panel provides valuable information about total estrogen status, and the mother hormone that acts as a precursor to all other hormones.</td>
<td></td>
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<tr>
<td><strong>LIFE EXTENSION THYROID PANEL (LC04131)</strong></td>
<td>$75</td>
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<tr>
<td>TSH, Free T3, Free T4.</td>
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<tr>
<td><strong>FEMALE COMPREHENSIVE HORMONE PANEL</strong></td>
<td>$299</td>
</tr>
<tr>
<td>(LC100011) CBC/Chemistry Profile (see description above), DHEA-S, Estradiol, Total Estrogens, Progesterone, Pregnenolone, Total and Free Testosterone, HDL, TSH, Free T3.</td>
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<tr>
<td><strong>MALE COMPREHENSIVE HORMONE PANEL</strong></td>
<td>$299</td>
</tr>
<tr>
<td>(LC100010) CBC/Chemistry Profile (see description above), DHEA-S, Estradiol, Testosterone, PSA, Pregnenolone, Total and Free Testosterone, HDL, TSH, Free T3.</td>
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<tr>
<td><strong>THE CBC/CHEMISTRY PROFILE (LC381822)</strong></td>
<td>$35</td>
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<tr>
<td>Note: This CBC/Chemistry Profile is included in many Life Extension panels. Please check panel descriptions.</td>
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<tr>
<td><strong>CARDIOVASCULAR RISK PROFILE</strong></td>
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<tr>
<td>Total Cholesterol/Creatinine Ratio</td>
<td>LDL Cholesterol Estimated CHD Risk</td>
</tr>
<tr>
<td><strong>LIVER FUNCTION PANEL</strong></td>
<td></td>
</tr>
<tr>
<td>AST (SGOT)</td>
<td>Total Bilirubin</td>
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<tr>
<td><strong>KIDNEY FUNCTION PANEL</strong></td>
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<tr>
<td>BUN</td>
<td>BUN/Creatinine Ratio</td>
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<tr>
<td><strong>BLOOD PROTEIN LEVELS</strong></td>
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<tr>
<td>Total Protein</td>
<td>Globulin</td>
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<tr>
<td><strong>BLOOD COUNT/RED AND WHITE BLOOD CELL PROFILE</strong></td>
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<tr>
<td>Red Blood Cell Count</td>
<td>Monocytes</td>
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<tr>
<td><strong>BLOOD MINERAL PANEL</strong></td>
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<tr>
<td>Calcium</td>
<td>Sodium</td>
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<tr>
<td><strong>COMPREHENSIVE THYROID PANEL</strong></td>
<td>$199</td>
</tr>
<tr>
<td>(LC100018) TSH, Free T4, Free T3, Reverse T3, Reverse T3, TPO, ATA</td>
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<tr>
<td><strong>FOOD SAFETY ALLERGY TEST</strong></td>
<td>$198</td>
</tr>
<tr>
<td>(LC73001) This test measures delayed (IgG) food allergies for 95 common foods.</td>
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<tr>
<td><strong>ADRENAL FUNCTION PANEL</strong></td>
<td>$136</td>
</tr>
<tr>
<td>(LC100021) DHEA-S, AM/PM Cortisol, Glucose, Insulin, Lipid Panel, RBC magnesium</td>
<td></td>
</tr>
<tr>
<td><strong>OMEGA SCORE</strong></td>
<td>$131.25</td>
</tr>
<tr>
<td>(LCOMEGA) Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Score™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.</td>
<td></td>
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<tr>
<td><strong>MITOCHONDRIAL FUNCTION PANEL</strong></td>
<td>$159</td>
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<tr>
<td>(LC100020) Carnitine (Free with Total), CoQ10, Glucose</td>
<td></td>
</tr>
<tr>
<td><strong>VAP™ TEST</strong></td>
<td>$90</td>
</tr>
<tr>
<td>(LC804500) The VAP™ cholesterol test provides a more comprehensive coronary heart disease (CHD) risk assessment than the conventional lipid profile. Direct measurements, not estimations, are provided for total cholesterol, LDL, HDL, VLDL, and cholesterol subclasses.</td>
<td></td>
</tr>
</tbody>
</table>
This test is used to check the blood level of DHEA-S, estradiol, free and total testosterone, cortisol, c-reactive protein (high sensitivity), vitamin B12, folate, insulin, and possibly cancer.

Thyroid antibodies profile (LC100004) $99
- Thyroid antithyroglobulin antibody (ATA) and thyroid peroxidase antibody (TPO).

THYROID ANTIBODY PROFILE (LC100004) $99
- Thyroid antithyroglobulin antibody (ATA) and thyroid peroxidase antibody (TPO).

VAP™ PLUS* (LC100009) $330
- Vitamin D 25-hydroxy.
- C-reactive protein (high sensitivity).
- Homocysteine.

CARCINOEMBRYONIC ANTIGEN (CEA) (LC120251) $99
- This test is used to check the blood level of CEA and will enable more precise dosing for anyone seeking to achieve and maintain high levels of this critical antioxidant.

Lp-PLA2 (PLAC™ TEST) (LC123240) $125
- This test is used to aid in predicting risk for coronary heart disease, and ischemic stroke associated with atherosclerosis. Lp-PLA2 is a cardiovascular risk factor that provides unique information about the stability of the plaque inside your arteries.

C-REA CTIVE PROTEIN (HIGH-SENSITIVITY) (LC120766) $42
- Measures inflammation factors in arteries. Recent studies indicate that C-reactive protein may be the most accurate risk factor for predicting heart attack and stroke.

FIBRINOGEN* (LC081610) $31
- High levels of this blood-clotting factor increase the risk of heart attack and stroke.

HOMOCYSTEINE (LC120869) $64
- Can indicate if you are likely to have a heart attack or stroke. Even if you take folic acid, you may still have dangerously high levels of this artery-clotting metabolic debris that can be lowered with high doses of TMG, vitamin B6, and vitamin B12.

MALE HEALTH
- PSA (PROSTATE-SPECIFIC ANTIGEN) (LC018322) $31
- Can provide an early warning sign for prostate disorders and possible cancer.

FREE-PSA (INCLUDES TOTAL PSA)* (LC140707) $116
- Primarily for women. Determines the proper amount in the body.

PREGNENOLONE* (LC140707) $116
- Used to determine ovarian failure, hirsutism, adrenal carcinoma, and Cushing's syndrome.

PROGESTERONE (LC004317) $55
- For non-member prices call 1-800-208-3444.

For non-member prices

THYROID ANTIBODY PROFILE (LC100004) $99
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**PRODUCTS**

**AMINO ACIDS**
- Acetyl-L-Carnitine
- Acetyl-L-Carnitine-ArGINate
- Branched Chain Amino Acids
- D, L-Phenylalanine Capsules
- Glycine Capsules
- L-Arginine Capsules
- Arginine/L-Ornithine Capsules
- L-Carnitine Capsules
- L-Carnitine Powder Natural Lemon Flavor
- L-Glutathione, L-Cysteine & C
- L-Glutamine Capsules
- L-Glutamine Powder
- L-Lysine Capsules
- L-Tyrosine Tablets
- Mega L-Glutathione Capsules
- N-Acetyl-L-Cysteine Capsules
- Optimized Carnitine with GlycoCarn®
- PharmaGABA
- Super Carnosine Capsules
- Taurine Capsules

**BONE & JOINT HEALTH**
- ArthroMax® with Theaflavins and AprèsFlex®
- ArthroMax® Advanced with UC-II® and AprèsFlex®
- Bone-Up®
- Bone Restore
- Bone Restore w/Vitamin K2
- Bone Strength Formula w/KoAct™
- Dr. Strum’s Intensive Bone Formula
- Fast Acting Joint Formula
- Glucosamine Chondroitin Capsules
- Meso-Zeaxanthin and C3G
- Meso-Zeaxanthin Plus Astaxanthin and C3G
- Super ArthroMax
- Acetyl-L-Carnitine-Arginate
- Acetyl-L-Carnitine
- AMINO ACIDS
- Arginine/L-Ornithine Capsules
- Acetyl-L-Carnitine-Arginate
- Acetyl-L-Carnitine
- Arginine/L-Ornithine Capsules
- Optimized Carnitine with GlycoCarn®
- PharmaGABA
- Super Carnosine Capsules
- Taurine Capsules

**HEART HEALTH**
- AppleWise Polyphenol
- Advanced Lipid Control
- Aspirin (Enteric Coated)
- Cardio Peak™ w/Standardized Hawthorn and Arjuna
- Cho-Leessa™
- D-Ribose Tablets
- D-Ribose Powder
- Endothelial Defense™ with Full-Spectrum Pomegranate™
- Fibrinogen Resist
- Forskolin
- Homocysteine Resist
- Natural BP Management
- Olive Leaf Vascular Support
- Peak ATP® with GlycoCarn®
- PhosphoMega®
- Policosanol
- Pycnogenol® French Maritime Pine Bark Extract
- Red Yeast Rice
- Super Absorbable CoQ10™ with d-Limonene
- Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
- Super Ubiquinol CoQ10
- Super Ubiquinol CoQ10 with BioPQQ®
- Super Ubiquinol CoQ10 with Enhanced Mitochondrial™ Support
- Theflavin Standardized Extract
- TMG Powder
- TMG Tablets

**HERBAL/PHYTO PRODUCTS**
- Artichoke Leaf Extract
- Asian Energy Boost
- Astaxanthin w/Phospholipids
- Berry Complete
- Blueberry extract
- Blueberry Extract w/Pomegranate
- Butterbur Extract w/Standardized
- Rosmarinic Acid
- Calcium D-Glucarate
- Enhanced Berry Complete with Acai
- Full-Spectrum Pomegranate™
- Grape Seed Extract with Resveratrol & Pterostilbene
- Huperzine A
- Kycolic® Garlic Formula 102 + 105
- Kycolic® Reserve
- Mega Green Tea Extract
- Mega Green Tea Extract (Decaffeinated)
- Mega Lycopene Extract
- Optimized Ashwagandha Extract
- Optimized Garlic
- Pomegranate Extract
- Pomegranate Juice Concentrate
- Pycnogenol

**INFLAMMATORY REACTIONS**
- Arthro-Immune Joint Support
- ArthroMax® with Theaflavins Boswellia
- Bromelain (Specially-coated)
- Cytokine Suppressor™ with EGCG
- DHA (Vegetarian Sourced)
- Fast Acting Joint Formula
- Ginger Force
- Krill Healthy Joint Formula
- 5-LOX Inhibitor w/ AprèsFlex®
- Mega EPA/DHA
- Mega GLA with Sesame Lignans
- MSM
- Omega-3 Whirl
- SerraEnzyme
- SODzyme® with GilSODIn® and Wolfberry
- Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
- Tart Cherry w/Standardized CherryPURE®
- Zyflamend® Whole Body

**LIVER HEALTH**
- Branch Chain Amino Acids
- N-Acetyl Cysteine
- Liver Efficiency Formula
- European Milk Thistle
- Advanced Phospholipid Delivery
- Hepatoprot
- SAMe
- Silymarin

**FOOD**
- Rich Rewards™ Black Bean Vegetable Soup
- Rich Rewards™ Spicy Cruciferous Vegetable Soup
- Rich Rewards™ Cruciferous Vegetable Soup
- Rich Rewards™ Lentil Soup
- Rich Rewards™ Mung Bean Soup with Turmeric
- Rich Rewards™ Coffee
- (Available in mocha, vanilla and decaffeinated)
- Rich Rewards™ Dark Chocolate

**HAIR CARE**
- Dr. Proctor’s Advanced Hair Formula
- Dr. Proctor’s Shampoo
- Super-Absorbable Tocotrienols

**INHIBITORY PRODUCTS**
- AppleWise Polyphenol
- Advanced Lipid Control
- Aspirin (Enteric Coated)
- Cardio Peak™ w/Standardized Hawthorn and Arjuna
- Cho-Leessa™
- D-Ribose Tablets
- D-Ribose Powder
- Endothelial Defense™ with Full-Spectrum Pomegranate™

**IMMUNE ENHANCEMENT**
- AHCC® (Active Hexose Correlated Compound)
- Black Cumin Seed Oil
- Black Cumin Seed Oil w/Bio-Curcumin®
- Buffered Vitamin C Powder
- Echinacea Extract
- FlorAssist™ Probioct
- i26 Hyperimmune Egg
- Immune Modulator w/Timonend®
- Immune Protect with PARACTIN®
- Lactoferrin
- Norwegian Shark Liver Oil
- Optimized Fucoidan w/ Maritech® 926
- ProBoost® Thymic Protein A
- Reishi Extract Mushroom Complex
- Vitamin C with Dihydroquercetin
- Winter Wellness™
- Zinc Lozenges

**BONE, JOINT & HEALTH**
- ArthroMax® with Theaflavins and AprèsFlex®
- ArthroMax® Advanced with UC-II® and AprèsFlex®
- Bone-Up®
- Bone Restore
- Bone Restore w/Vitamin K2
- Bone Strength Formula w/KoAct™
- Dr. Strum’s Intensive Bone Formula
- Fast Acting Joint Formula
- Glucosamine Chondroitin Capsules
- Meso-Zeaxanthin and C3G
- Meso-Zeaxanthin Plus Astaxanthin and C3G
- Super ArthroMax
- Ad
- Acetyl-L-Carnitine-Arginate
- Acetyl-L-Carnitine
- AMINO ACIDS
- Arginine/L-Ornithine Capsules
- Acetyl-L-Carnitine-Arginate
- Acetyl-L-Carnitine
- Arginine/L-Ornithine Capsules
- Optimized Carnitine with GlycoCarn®
- PharmaGABA
- Super Carnosine Capsules
- Taurine Capsules

**DIGESTIVE**
- Bifido Gl Balance
- Carnosoothe w/PicroProtect
- Digest RC™
- Esophageal Guardian
- Enhanced Super Digestive Enzymes
- Extraordinary Enzymes
- LACTOSOL V™ Long Lasting Digestion
- Life Flora™
- Natural EsophaGuard
- Pancreatin
- Regimint
- Therals Probiotics

**DURK AND SANDY PRODUCTS**
- Blast™
- Inner Power™

**EYE CARE**
- Bilberry Extract
- Brite Eyes III
- Eye Pressure Support with Mirtogenol®
- Solarshield Sunglasses
- Super Zeaxanthin with Lutein & Meso-Zeaxanthin Plus Astaxanthin and C3G
- Super Zeaxanthin with Lutein & Meso-Zeaxanthin and C3G

**FIBER**
- AppleWise Polyphenol
- Fiber Food
- TruFiber®
- WellBetX PGX® plus Mulberry

**HAIR CARE**
- Dr. Proctor’s Advanced Hair Formula
- Dr. Proctor’s Shampoo
- Super-Absorbable Tocotrienols

**HEART HEALTH**
- AppleWise Polyphenol
- Advanced Lipid Control
- Aspirin (Enteric Coated)
- Cardio Peak™ w/Standardized Hawthorn and Arjuna
- Cho-Leessa™
- D-Ribose Tablets
- D-Ribose Powder
- Endothelial Defense™ with Full-Spectrum Pomegranate™
- Fibrinogen Resist
- Forskolin
- Homocysteine Resist
- Natural BP Management
- Olive Leaf Vascular Support
- Peak ATP® with GlycoCarn®
- PhosphoMega®
- Policosanol
- Pycnogenol® French Maritime Pine Bark Extract
- Red Yeast Rice
- Super Absorbable CoQ10™ with d-Limonene
- Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
- Super Ubiquinol CoQ10
- Super Ubiquinol CoQ10 with BioPQQ®
- Super Ubiquinol CoQ10 with Enhanced Mitochondrial™ Support
- Theflavin Standardized Extract
- TMG Powder
- TMG Tablets

**HERBAL/PHYTO PRODUCTS**
- Artichoke Leaf Extract
- Asian Energy Boost
- Astaxanthin w/Phospholipids
- Berry Complete
- Blueberry extract
- Blueberry Extract w/Pomegranate
- Butterbur Extract w/Standardized
- Rosmarinic Acid
- Calcium D-Glucarate
- Enhanced Berry Complete with Acai
- Full-Spectrum Pomegranate™
- Grape Seed Extract with Resveratrol & Pterostilbene
- Huperzine A
- Kycolic® Garlic Formula 102 + 105
- Kycolic® Reserve
- Mega Green Tea Extract
- Mega Green Tea Extract (Decaffeinated)
- (also w/ CoffeeGenic® Green Coffee Extract)
- Mega Lycopene Extract
- Optimized Ashwagandha Extract
- Optimized Garlic
- Pomegranate Extract
- Pomegranate Juice Concentrate
- Pycnogenol

**INFLAMMATORY REACTIONS**
- Arthro-Immune Joint Support
- ArthroMax® with Theaflavins Boswellia
- Bromelain (Specially-coated)
- Cytokine Suppressor™ with EGCG
- DHA (Vegetarian Sourced)
- Fast Acting Joint Formula
- Ginger Force
- Krill Healthy Joint Formula
- 5-LOX Inhibitor w/ AprèsFlex®
- Mega EPA/DHA
- Mega GLA with Sesame Lignans
- MSM
- Omega-3 Whirl
- SerraEnzyme
- SODzyme® with GilSODIn® and Wolfberry
- Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract
- Tart Cherry w/Standardized CherryPURE®
- Zyflamend® Whole Body

**LIVER HEALTH**
- Branch Chain Amino Acids
- N-Acetyl Cysteine
- Liver Efficiency Formula
- European Milk Thistle
- Advanced Phospholipid Delivery
- Hepatoprot
- SAMe
- Silymarin
### Buyers Club Order Form

#### To order call: 1.954.766.8433 or 1.800.544.4440

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**SUB-TOTAL OF COLUMN 2**

**DECEMBER 2013**  
**LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**
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<td>Calcium D-Gluconate - 200 mg, 60 veg. caps</td>
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**Sub-Total of Column 3: $575.85**

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**Sub-Total of Column 4: $728.40**
### Buyers Club Order Form

**DECEMBER 2013 LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

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To order call: 1.954.766.8433 or 1.800.544.4440
### Buyers Club Order Form

**To order online visit: www.LifeExtension.com**

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**SUB-TOTAL OF COLUMN 7**

**LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS**

**DECEMBER 2013**

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**SUB-TOTAL OF COLUMN 8**
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**SUB-TOTAL OF COLUMN 9**

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**SUB-TOTAL OF COLUMN 10**

To order call: 1.954.766.8433 or 1.800.544.4440
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**SUB-TOTAL OF COLUMN 11**

**SUB-TOTAL OF COLUMN 12**
## Buyers Club Order Form

### DECEMBER 2013

LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

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To order call: 1.954.766.8433 or 1.800.544.4440

**SUB-TOTAL OF COLUMN 13**

**SUB-TOTAL OF COLUMN 14**
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<tr>
<td>01407</td>
<td>SUPER SAW PALMETTO w/BETA-SITOSTEROL - 30 softgels</td>
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<tr>
<td>01778</td>
<td>SUPER SELENIUM COMPLEX - 200 mcg, 100 veg. caps</td>
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<td>01723</td>
<td>TART CHERRY EXTRACT w/STANDARDIZED CHERRYPURE® - 60 veg. caps</td>
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<td>00199</td>
<td>TAURINE - 1,000 mg, 50 caps</td>
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<td>00133</td>
<td>TAURINE POWDER - 300 grams</td>
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<td>01304</td>
<td>THEAFLAVIN STANDARDIZED EXTRACT - 30 veg. caps</td>
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<td>L THEAINE - 100 mg, 60 veg. caps</td>
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<td>01038</td>
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<td>VITAMIN K2 (LOW-DOSE) - 45 mcg, 90 softgels</td>
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<td>WINTER WELLNESS™ - 60 caps</td>
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**These products are not 25% off retail price.**

**Not eligible for member discount or member renewal product credit.**

***Due to license restrictions, this product is not for sale to customers outside of the USA.**

† Member pricing not valid on this item.

†† Due to license restrictions, this product is not for sale to Canada.
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When you join the Life Extension Foundation®, we update you on the latest published medical research by sending you FREE books. Our most impressive publication is the 1,400-page Disease Prevention and Treatment protocol book that contains novel therapies to treat 130 common diseases of aging. Disease Prevention and Treatment is the only book that combines conventional and alternative therapies in order to implement a treatment regimen for fighting the multiple processes involved in degenerative disease.

Each month, Life Extension Foundation® members receive a magazine packed with the latest medical findings from around the world. Members also can call a toll-free phone number to talk to our knowledgeable health advisors about their health issues.

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1. Call toll-free 1-800-544-4440
2. Go to www.lef.org
3. Fax back to 1-866-728-1050
4. Mail to: Life Extension Foundation®, PO Box 407198, Ft. Lauderdale, FL 33340-7198
   Local Number: 954-766-8433

MEMBERSHIP APPLICATION

I want to contribute to your research efforts to extend the healthy human life span. Enclosed is my first year’s membership donation of $75 to join the most elite group of longevity enthusiasts in the world. (Canadians add $7, all others outside the U.S. add $35)

Item code: MEMB1. Call for multiple year membership rates.

Name ________________________________

Address ________________________________

City ___________________ ST ________ ZIP _____

Email ____________________ Phone __________________________

☐ Check enclosed (payable to Life Extension Foundation®)

☐ Charge my cc:

Card # ____________________ Exp. ___/___

LIFE EXTENSION MEMBERS RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

DECEMBER 2013
### Buyers Club Order Form

**ORDER SUBTOTALS**

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<th>Sub-Total Column 17</th>
<th>Sub-Total Column 18</th>
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**ORDER TOTALS**

- Sub-Total A (Sub-total of Columns 1 through 18): $5.50
- Postage and Handling (Any size order, continental U.S.): $5.50
- C.O.D.s (Add $7 for C.O.D. orders)
- Shipping

**GRAND TOTAL** (Must be in U.S. dollars)

**BILL TO ADDRESS**

- Name: 
- E-mail: 
- Address: 
- City/State/Zip-Postal Code: 
- Country: 
- Phone: 
- Fax: 
- Visa/Mastercard/AmeriExpress/Discover: 
- Exp. Date: 
- Signature: 

**SHIP TO ADDRESS**

- Name: 
- E-mail: 
- Address: 
- City/State/Zip-Postal Code: 
- Country: 
- Phone: 
- Fax: 
- Signature: 

---

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Or Call Toll Free 1-800-544-4440 • Fax: 866-728-1050
Local Number: 954-766-8433

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- Member No.: 
- Print membership no. for member discount

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- I want to join the Life Extension Foundation®.
  Enclosed is $75 for annual membership. (Canadians add $7.00, all others outside the U.S. add $35.00. Send me: Disease Prevention & Treatment Protocol Book

- Check here for C.O.D. orders
- Check here for UPS Blue Label (2nd Day)
- Check here for UPS Red Label (Overnight)

---

**PRICES SUBJECT TO CHANGE WITHOUT NOTICE. PLEASE NOTIFY THE LIFE EXTENSION FOUNDATION® OF ANY ADDRESS CHANGE.**
## Buyers Club Order Form

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<td>I'M TOO YOUNG FOR THIS • by Suzanne Somers</td>
<td>Until November 13, 2013</td>
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Most people don’t get enough oil-based nutrients like vitamin K, lycopene, and gamma tocopherol. This problem is solved with a one-per-day softgel called Super Booster. It provides high potencies of fat-soluble compounds lacking in dry powder formulas, along with other nutrients.

Just one SUPER BOOSTER provides:

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- **GINKGO** Hundreds of studies substantiate the multifaceted effects of Ginkgo biloba in promoting healthy circulatory and neurological function.

- **CHLOROPHYLLIN** Scientific studies indicate that chlorophyllin may protect against environmentally induced damage to DNA.

A bottle of 60 Super Booster softgels retails for $42. If a member buys four bottles, the price is reduced to $28.50 per bottle. The Super Booster saves consumers huge dollars by combining a wide variety of costly nutrients into one daily softgel. If you add up the price of the individual ingredients contained in the Super Booster, you would spend two to three times more for this potency if taken separately.

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

Contains soybeans.

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

Tomat-O-Red® is a registered trademark of LycoRed, Ltd.

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2%-4% of your skeleton is “rebuilt” every year as calcium and minerals leave the bone and must be replaced.

Jarrow Formulas® Presents . . .
A Complete Multi-Nutrient Bone Health System!

Bone-Up® provides your body with much needed calcium as well as essential nutrients for building strong bones.* It utilizes the finest source of calcium available: Australian/New Zealand bovine bone hydroxyapatite from chemical-free, range grazed calves less than two years old.

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- **Ossein Microcrystalline Hydroxyapatite (MCHA):** Promotes calcium balance.*
- **Vitamin D$_3$:** Converts to calcitriol to enhance calcium absorption.
- **MK-7:** The more bioavailable form of Vitamin K$_2$, which is needed for building bone matrix and proper calcium distribution.*
- **Boron:** A trace mineral important in calcium retention.*
- **Manganese, Copper and Zinc:** Essential trace minerals involved in the formation of bone.*

Jarrow Formulas® Bone-Up®, 240 capsules Item # 00313: $28.95

If a member buys four bottles, the price will be reduced to $20.41 per bottle.

To order, call (800)544-4440 or visit www.LifeExtension.com

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A Partnership in Heart Health

New Chapter Zyflamend & Life Extension Super Omega-3

A Holistic Approach to Cardiovascular Health

Maintaining heart health and a strong cardiovascular system are vital to a healthy body. Diet and exercise are the most important factors. Scientists and doctors both agree that a program of preventive health today is preferable to a treatment program tomorrow. But unfortunately, most Americans don’t eat enough heart-healthy foods or get enough exercise. We now know that there are several additional factors that can support cardiovascular health, including:

- Supporting the body’s healthy inflammation response
- Consuming “good fats” such as Omega-3 fatty acids

What is the Inflammation Response?

Our body’s inflammation response is a natural healing process. We often think of the inflammation response as something we can feel—such as in our joints and muscles where there are large numbers of sensitive nerve endings. But we can also have a response we can’t feel, where sensitive nerves aren’t concentrated—including in the heart and blood vessels. Whether we’re aware of it or not, this inflammation response can affect every organ and cell.

Extensively Researched Herbal Blend

New Chapter’s Zyflamend represents a scientific breakthrough in supporting a healthy inflammation response.* Zyflamend is formulated based on a large body of scientific research showing its ten herbs and spices contain hundreds of plant compounds that support a healthy inflammation response.* Just as important as a daily multivitamin, Zyflamend is the patented herbal protocol to help your whole body’s natural inflammation process stay balanced and healthy every day.* Zyflamend has been studied at leading research institutions and shown to benefit multiple areas of health, including heart health.*

Omega-3 is Important for Cardiovascular Health

Life Extension’s Super Omega-3 is a premium, scientifically validated fish oil concentrate. Super Omega-3 EPA/DHA with Sesame Lignans and Olive Fruit Extract promotes a healthy heart.* Fish oils (and other fatty acids) have a tendency to oxidize, rendering them nutritionally inferior. Scientific studies show that when added to fish oil, sesame lignans safeguard against oxidation and direct fatty acids toward pathways that help with inflammatory reactions.1 To further emulate the benefits of a Mediterranean diet, Super Omega-3 delivers standardized, high-potency olive fruit extract. Research shows that when combined with olive oil, fish oil supplements help with inflammation better than fish oil alone.2

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

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Some probiotic companies succeed at marketing but fail at science. With our patented delivery and patented prebiotic stimulation, Master Supplements Inc. is raising the standard. For digestive regularity, immune enhancement, and nutrient absorption, Theralac® is the one probiotic that can deliver it all.

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  - 30 capsules
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  - Retail: $47.95

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  - 6.2 oz
  - Item#: 01386
  - Retail: $32.95

- **TruFlora®**
  - 32 Capsules
  - Item#: 01389
  - Retail: $42.95

Call *Life Extension* now to order Theralac®, TruFlora® or TruFiber® to feel the benefits for yourself.

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As we get older, our eyes become vulnerable to a variety of insults that can cause irritation and dry eye. With just a few drops of the proper eye lubricant, eye irritation stemming from dryness may be alleviated.

**Brite Eyes** provides a powerful dose of two well-established lubricants in every drop, soothing eye discomfort without irritation.

*Hydroxymethyl-cellulose* and *glycerin* are FDA-approved for ophthalmic use and are uniquely preserved with potent *antioxidants* and *anti-glycating* agents.

The **Brite Eyes** formula is buffered in a way to make it soothing to the eye. The suggested use of **Brite Eyes III** is to apply 1 to 2 drops in each eye every day.

Each box of **Brite Eyes III** contains two individual vials that provide 5 mL each. The reason for putting **Brite Eyes** into individual vials is to reduce the risk of bacterial contamination. Having small vials also makes it convenient for consumers to keep **Brite Eyes** readily accessible at home, the office, in one’s purse or pocket, and other places where access to a soothing eye drop is needed.

The retail price for a box containing two 5 mL vials of **Brite Eyes III** is $34. If a member buys four boxes, the price is reduced to $24 per box.

**To order Brite Eyes III, call 1-800-544-4440** or visit [www.LifeExtension.com](http://www.LifeExtension.com)
Since Life Extension® introduced CoQ10 in 1983, our scientists have continued to develop increased potency and absorbability.

**Super Ubiquinol CoQ10 with Enhanced Mitochondrial Support™** contains PrimaVie® shilajit that doubles levels of CoQ10 in the mitochondria.1

Combining CoQ10 and shilajit produced a 56% increase in energy production in the brain, and in muscle there was a 144% increase in energy production.2

The primary reason people take CoQ10 supplements is to help **restore** youthful energy levels.

**Shilajit** boosts CoQ10’s beneficial effects by stabilizing CoQ10 in the superior ubiquinol form, which prolongs its action at the cellular level.3,4 Additionally, **shilajit** facilitates the more efficient delivery of CoQ10 into the mitochondria, which results in enhanced cellular energy.4,5

Shilajit helps the mitochondria convert fats and sugars into the body’s main source of energy, ATP (adenosine triphosphate).5-9

Combining **ubiquinol CoQ10** with **shilajit** generates a powerful synergy that supports more youthful cellular energy production than CoQ10 alone.2,4,5

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100  COMPLETE ARSENAL FOR PROSTATE CANCER PREVENTION
Published studies indicate a wide range of nutrients that protect against the development and progression of prostate cancer. These nutrients also confer huge protection against the common disorders of aging.