

Homocysteine Accelerates Brain Aging

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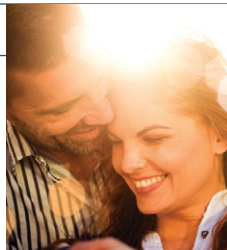
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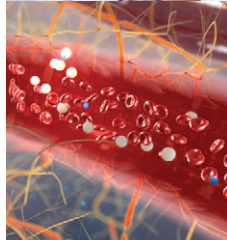
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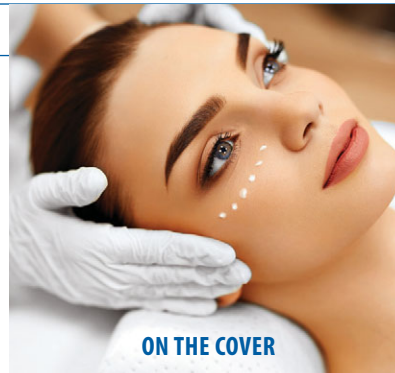
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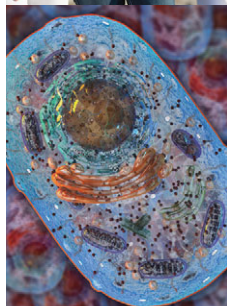
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In 1981, *Life Extension*® published data showing that high **homocysteine** blood levels increase **heart attack** and **stroke** risk. Alarming *new* studies link high **homocysteine** to degenerative **brain** disorders. Specialized forms of folate and other B vitamins can lower homocysteine to safer ranges.



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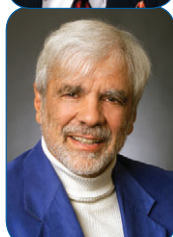
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BY WILLIAM FALOON

Homocysteine and Brain Aging

Homocysteine was discovered in **1932**, but its role in promoting **atherosclerosis** went largely unrecognized until **1969**.¹

For many decades, conventional medicine was so focused on **cholesterol** that **homocysteine** went unnoticed.

We helped ignite the debate with our **1981** publication showing high **homocysteine** blood levels increase **heart attack** and **stroke** risk. Since then, we've published dozens of articles about the life-shortening impact of excess homocysteine, and how easy it is to lower it.

New studies link high **homocysteine** to degenerative **brain** disorders. These reports yield critical pieces of data that explain why some homocysteine-lowering studies do not yield expected benefits.²⁻⁴

For example, a group of researchers found that people using **B vitamins** to lower **homocysteine** must also have sufficient **omega-3s** to protect **brain** function.⁵

Brain cells require **DHA** (an omega-3 fat) for structure and function. It is not surprising that some clinical trials using **B vitamins** to improve neurological status show benefits **only** in people with higher **omega-3** levels.⁶

Additional findings reveal how much more effective "activated" **B vitamins** such as **5-MTHF** (folate) are at pushing down elevated **homocysteine**, especially in elderly individuals.^{7,8}

This issue of **Life Extension Magazine**® reviews startling new findings about the pathological role of **homocysteine** in degenerative **brain aging**.



In the **January 2017** issue of this magazine, we described how **abnormal clotting** inside blood vessels (thrombosis) is the leading cause of disability and death in people over age 50.⁹

Those with **atrial fibrillation** (irregular rhythm in upper heart chambers) are at a **five-fold increased risk for stroke**.¹⁰

Anticoagulant **drugs** (such as warfarin or Eliquis®) **reduce** thrombotic stroke risk by about **60%** in atrial fibrillation cases.^{11,12} So what about the **40%** of **atrial fibrillation** patients that do **not** respond to anticoagulant drugs?

One solution is to suppress their elevated **homocysteine**.

Excess **homocysteine** contributes to **thrombotic** events. In a study of **atrial fibrillation** patients, high homocysteine **quadrupled** risk of **stroke**.¹³

Homocysteine **increases** as we age. One study found elevated **homocysteine** levels (defined as greater than **14 µmol/L**) in almost **30%** of people older than 65 years, a figure that rose to more than **40%** in those aged 80 years and older. Having dangerously high homocysteine increases the incidence of **stroke** and other vascular disorders.^{14,15}

Considering how easy it is to bring **homocysteine** into safer ranges, it is regrettable that the medical establishment does not focus more attention on this common disease risk factor.

Cognitive Impairment in Parkinson's Disease

Parkinson's disease not only causes loss of motor control, but a high percentage of patients develop serious cognitive impairment.

A study published in **January 2017** showed that Parkinson's

patients with cognitive dysfunction were more likely to have **five-point** higher homocysteine levels.¹⁶

Just imagine how easy it might be to restore cognition in these individuals by giving them high-potency **activated B vitamins** like **5-MTHF** (folic acid) and **methylcobalamin** (vitamin B12).

Low-Potency Folate Supplements Often Ineffective

Most conventional physicians are not trained on the optimal use of folate supplements. As a result,

they inadvertently design clinical trials using **low** potencies of the least effective **forms** of folic acid.

The **chart** on this page shows the many **enzymatic** steps required to convert the **folic acid** found in commercial supplements into activated **5-MTHF**.

Some people only need commercial **folic acid** to lower their **homocysteine** since they have high **enzymatic** activity to convert it to **5-MTHF**. Many others lack the ability to convert **folic acid** to its active form (**5-MTHF**), especially as they age.^{17,18} These individuals often suffer disorders related to **excess homocysteine**.^{19,22}

Why Conventional Folate Supplements Do Not Optimally Lower Homocysteine

Homocysteine is decreased in the body by **5-methyltetrahydrofolate** (5-MTHF).⁷

When folic acid is taken, it must go through several enzymatic changes to convert to **5-MTHF**.

A surprising number of people, especially as they age, lack the enzymes needed to convert **folic acid** into metabolically active **5-MTHF**.¹⁷ These individuals need to take a 5-MTHF supplement to directly supply their body with the form of folate that reduces homocysteine.

This chart shows the many steps required by the body to convert folic acid to **5-MTHF**.

If one is supplementing with **folic acid** yet still suffers higher-than-optimal homocysteine, they should add **1 mg (1,000 micrograms)** to **10 mg (10,000 micrograms)** of **5-MTHF** to their daily supplement regimen. This higher potency 5-MTHF supplement is now available **without** a prescription.

Synthetic Folic Acid
(Used in most commercial supplements)

Dihydrofolate

Tetrahydrofolate

10-formyl-THF

5,10 Methenyl THF

5,10 Methylene THF

5-MTHF

(Active Form of Folate)



There are studies where **foliac acid** potencies of **400-800 mcg** are used with little benefit derived. We know from decades of experience in working with our supporters that **higher** doses of folate and other B vitamins are often needed to drop **homocysteine** into safer ranges.

For instance, when a blood test reveals elevated homocysteine, we suggest that **1,000 mcg** of **5-MTHF** be taken once or twice daily in addition to the **400 mcg** of **5-MTHF** included in our multi-vitamin formulas.

If this dose fails to sufficiently reduce homocysteine, we then suggest **5,000 mcg** of **5-MTHF** once or twice daily, along with **higher** potencies of the **methylcobalamin** form of vitamin B12 and higher doses of **pyridoxal-5-phosphate**, which is an “activated” form of **vitamin B6**.

Compared to poorly designed trials where **400-800 mcg** potencies of **foliac acid** are used along with less active forms of B12 and B6, we are suggesting **higher** doses of more effective forms of B vitamins.

Based on very recent studies, anyone with elevated **homocys-**

teine should also consider taking an **omega-3** supplement in order to derive brain-health benefits.^{5,6,23}

Omega-3s and B Vitamins Prevent Brain Atrophy

As we age, our brain literally shrivels in size. As this happens, we experience a wide range of neurological disorders.

A study was done on elderly people with mild cognitive impairment who were randomly assigned to receive folic acid (**800 mcg**), vitamin B6 (**20 mg**), and B12 (**500 mcg**) or placebo.⁵

The study authors described these potencies as “**high-dose**,” whereas for many people with elevated **homocysteine**, these are insufficient potencies of less active forms of **B vitamins**. This study nonetheless revealed some intriguing new findings.

Both groups (B-vitamin supplemented and placebo) underwent **MRI brain imaging** at baseline and two years later.

In the **B-vitamin** group that had high baseline **omega-3** blood levels, the mean **brain atrophy** rate was slowed by a remarkable

40% compared to placebo.⁵ There was no significant benefit amongst the B-vitamin group with low baseline **omega-3** blood levels.

In the **placebo** arm of the study, there was no slowdown of **brain shrinkage** (atrophy) even in the presence of higher **omega-3s**.

This study provides intriguing new data on the importance of consuming **B vitamins** and **omega-3s** to protect against **brain atrophy**.

Another recent study showed **B vitamins** plus **omega-3s** enhanced the **mental performance** benefits in elderly people with mild cognitive impairment. Among those with good **omega-3** status, **B-vitamin** treatment resulted in **63% more** elderly subjects deriving cognitive benefits.⁶

As with the **brain atrophy** study, this trial showed there was no effect of **B vitamins** when **omega-3** levels are low, but significant benefit when **B vitamins** were given to elderly subjects whose **omega-3** status was in the upper-normal range.

Take-home lesson:

**B vitamins + omega-3s =
Delayed Brain Aging.**



Postmenopausal Mental Decline

Postmenopausal women are prone to accelerated loss of a wide range of cognitive functions. Until recently, this was blamed on lack of estrogen, progesterone and testosterone brought about by menopause.

A study was done using a battery of tests of neurological functions in postmenopausal women and found that those with elevated **homocysteine** suffered the greatest percentage of **cognitive decline**. Here is the study author's conclusion:

*"In summary, hyperhomocysteinemia was related with increased risk of decline in executive functioning, complex attention, cognitive flexibility, and memory in postmenopausal women."*²⁴

Record Number of Centenarians

According to the **Centers for Disease Control and Prevention**, the number of people in the United States age **100** and older has increased by **43.6%** since year **2000**.²⁵

Whether people are **demented** by the time they reach 100 years has a lot to do with their behavior in earlier years, and genetic factors.

A recent study on **centenarians** evaluated a number of parameters and found **dementia** to be associated with **higher** blood levels of **homocysteine** and proinflammatory factors like **C-reactive protein**.²⁶

Both of these **blood markers** are modifiable, meaning they can be brought down to safer ranges.

Protection against Non-Alzheimer's Dementia

A number of studies have sought to assess the effectiveness of nutrients like **vitamin E** (alpha tocopherol) and risk of **dementia**. Some studies indicate benefits to antioxidant nutrients while others fail to show a protective effect.

A study evaluated blood levels of vitamin A, vitamin E, and homocysteine in elderly persons with and without dementia. The findings showed decreased risk of non-Alzheimer's dementia in those with **higher** blood levels of **vitamins A and E** and lower levels of **homocysteine**.²⁷

Reference Ranges Need to be Revised

A deficiency of **vitamin B12** alone can cause mild cognitive impairment (and dementia).

A study looked at blood (serum) concentrations of vitamin B12 in a group of people suffering typical age-related neurological dysfunctions.

The findings showed that people with **vitamin B12** in the "low" normal reference ranges showed significantly poorer learning ability and performance than did patients with "high" normal vitamin B12 status.²⁸

The implications from this study are that **reference ranges** need to be amended so that today's "low normal" B12 results are redefined as "deficient."

Of interest are results of standard B12 blood tests that some of our supporters get. They often show B12 levels far above "normal" reference ranges. We get calls from people asking if they are taking too much vitamin B12. Our response is that virtually all of our customers have these higher B12 readings and this may be a good indicator of *optimal* B12 status.

Even Fetuses Need Protection

A number of previous studies associate prenatal maternal folate deficiency with reduced prenatal brain growth in offspring. Little is known about the longer-term impact.

A study of Dutch children aged **6-8 years** was done utilizing MRI brain scans and other measures of intelligence. Children of mothers with insufficient folate showed poorer performance on language and visuospatial scores. The authors concluded:

“Our findings suggest that folate insufficiency in early pregnancy has a long-lasting, global effect on brain development and is, together with homocysteine levels, associated with poorer cognitive performance.”²⁹

Young Adults may Benefit From B Vitamins

A study of people aged 18-40 years was done to compare the effects of a multivitamin supplement on mood.

In response to the multivitamin, **homocysteine** levels dropped significantly with a corresponding improvement in mood as measured by a recognized score of mental depression.³⁰

Younger people respond well to standard B vitamins because their **enzymatic** conversion systems function at a high level, meaning they readily convert folate into **5-MTHF**.

As people age, their ability to absorb and enzymatically metabolize **folic acid** is compromised, which is why homocysteine levels surge higher with age. The solution is to use the **5-MTHF** form of folate that requires no **enzymatic** conversion to reduce **homocysteine**.

What are “High” Homocysteine Levels?

When **Life Extension®** evaluated **homocysteine toxicity** in the mid-1990s, we found persuasive evidence that optimal levels were below 8 µmol/L of blood.

The medical establishment has never been able to agree on what a

“safe” homocysteine level really is, and there are many contradictory findings in the published literature.

Research has demonstrated that homocysteine levels above **10 µmol/L** are associated with increased heart-attack risk.³¹ Another study showed an increased cardiac risk with homocysteine levels above **9 µmol/L** and that the risk increased sharply as levels rise to **15 µmol/L** or greater.³²

A recent study found that homocysteine levels higher than **15 µmol/L** were associated with almost **double** the prevalence of **dementia**, along with cognitive and functional impairment.³³

These variations are commonly found across the different published studies and explain why conventional medicine has not been able to reach a consensus as to what **optimal** homocysteine levels should be.

From a practical standpoint, many aging individuals will be challenged to bring their homocysteine levels to below 8 µmol/L because of impaired B vitamin-dependent detoxification systems. That does not mean, however, that there is not a significant benefit to lowering homocysteine to, let's say, below 12 µmol/L, as opposed to letting it stay at **15 µmol/L** or higher.

Impact of Homocysteine on Cardiac-Stenting Patients

In response to narrowing or blockage of a **coronary artery**, most patients today have a metal **stent** inserted into the occluded artery to restore blood flow to the affected heart muscle. This eliminates the need for open-chest coronary bypass surgery and its many complications.



Homocysteine Blood Testing

One reason we initiated direct-to-consumer testing 20 years ago was that many doctors refused to prescribe homocysteine blood tests when our members requested them.

We thought this to be highly inappropriate, considering there was no risk to someone merely checking their homocysteine blood levels. We are confident that our offering homocysteine blood tests saved lives based on surprisingly high levels that some people have and are able to lower by taking more B vitamins.

If you have not had your **homocysteine** checked recently, you can order it today and have your blood drawn at your convenience at a blood-draw station near you.

Our regular discount price to test homocysteine levels is **\$54**, but if you order before August 31, 2017, we will include our **CBC/Chemistry** blood panel at no charge (\$35 value). Page 15 itemizes the many important tests included in our **CBC/Chemistry** panel.

To order a **homocysteine blood test** for **\$54** and receive a complimentary **CBC/Chemistry** panel, call **1-800-208-3444** or log on to LifeExtension.com/homocysteine



The concern is how long the stenting of one or multiple arteries will last and whether there will be long term cardiovascular problems.

A study was done on patients who underwent coronary-artery stenting to investigate whether elevated homocysteine at admission predicted long-term outcomes.

The subjects were divided into a group whose **homocysteine** blood levels were under 12 $\mu\text{mol/L}$ compared to those 12 $\mu\text{mol/L}$ and over.

After a mean follow-up of almost **five years**, rates of major adverse cardiac events were **30% higher** in the group whose **homocysteine** was **12 $\mu\text{mol/L}$** and above compared to those whose homocysteine was under 12 $\mu\text{mol/L}$.³⁴

The most striking variable was **cardiac death**. Stent patients with **homocysteine** of **12 $\mu\text{mol/L}$** and above were more than twice as likely to die from cardiac death over the study period compared to those whose admission homocysteine readings were below 12 $\mu\text{mol/L}$.

Erectile Dysfunction

An early sign of **vascular disease** in men can be **erectile dysfunction**, which is the topic of endless television advertisements promoting expensive drugs like Cialis® and Viagra®.

A study comparing men with erectile dysfunction with controls found significantly reduced penile blood flow velocity in men with homocysteine levels above 12.65 $\mu\text{mol/L}$. This led the researchers to suggest that ***“elevation of homocysteine levels was associated with an increased risk of ED.”***³⁵

Stroke Induced by Homocysteine

A number of studies have looked at **homocysteine** blood levels and **stroke**, with inconsistent findings reported.

One reason is that the many independent risk factors for stroke (such as hypertension, glucose, inflammation, and lipids) make it

difficult to pinpoint homocysteine as a specific **independent** causation factor.

A study published at the end of **2016** looked at stroke patients treated with the clot-busting drug **tPA** and found poorer outcomes in acute stroke patients with high homocysteine.

A striking finding from this study was that mean **homocysteine** levels in these ischemic stroke cases was **22.62 $\mu\text{mol/L}$** , which is **high** by everyone's standards.³⁶

Yet most doctors today are not checking their elderly patients' homocysteine blood levels, leaving a correctable risk factor unmeasured that is of importance to older people.

Individual Variation of Blood-Homocysteine Levels

Life Extension informs readers of novel methods to counteract **age-related** diseases that are **overlooked** by the medical mainstream.

We gauge **efficacy** based on peer-reviewed published findings, along with real-world interactions with physicians and our loyal supporters.

Over the past 37 years, we've reviewed thousands of homocysteine blood-test results and observed a wide variation.

Some people with healthy detoxification systems present with low homocysteine (under **8 $\mu\text{mol/L}$**), while other similarly situated individuals have strikingly higher levels.

Folic acid and **vitamin B12** detoxify homocysteine via the "methylation"³⁷ pathway, whereas **vitamin B6** detoxifies homocysteine via the "transsulfuration"³⁸ pathway. Activated forms of these vitamins (such as **5-MTHF**, **methylcobalamin**, and **pyridoxal-5-phosphate**) provide direct maintenance of these two homocysteine-detoxification pathways.

As humans age, homocysteine levels tend to rise, necessitating

more aggressive use of proven homocysteine-lowering nutrients.

Many of you have recently had your homocysteine levels tested and can easily see where your level is.

If you have used our convenient blood-testing service, we keep your records on file back to year 2012. To receive a free copy of your blood results, call **1-800-208-3444** or send us an email to customer.service@lifeextension.com

No More Need for Prescription B Vitamins

Nearly two decades ago, pharmaceutical companies obtained **patents** for B-vitamin formulas that contained the metabolically active **5-MTHF** form of folate.

These prescription drug B-vitamin formulas are still sold at prices that exceed **\$200** a month. Now that patents have expired, consumers have access

to superior formulas that provide high-potency **5-MTHF** along with bioactive forms of vitamins B6 and B12 for a fraction of the prescription-drug price.

A large number of adults suffer the toxic effects of high homocysteine, which steadily increases as a consequence of normal aging.

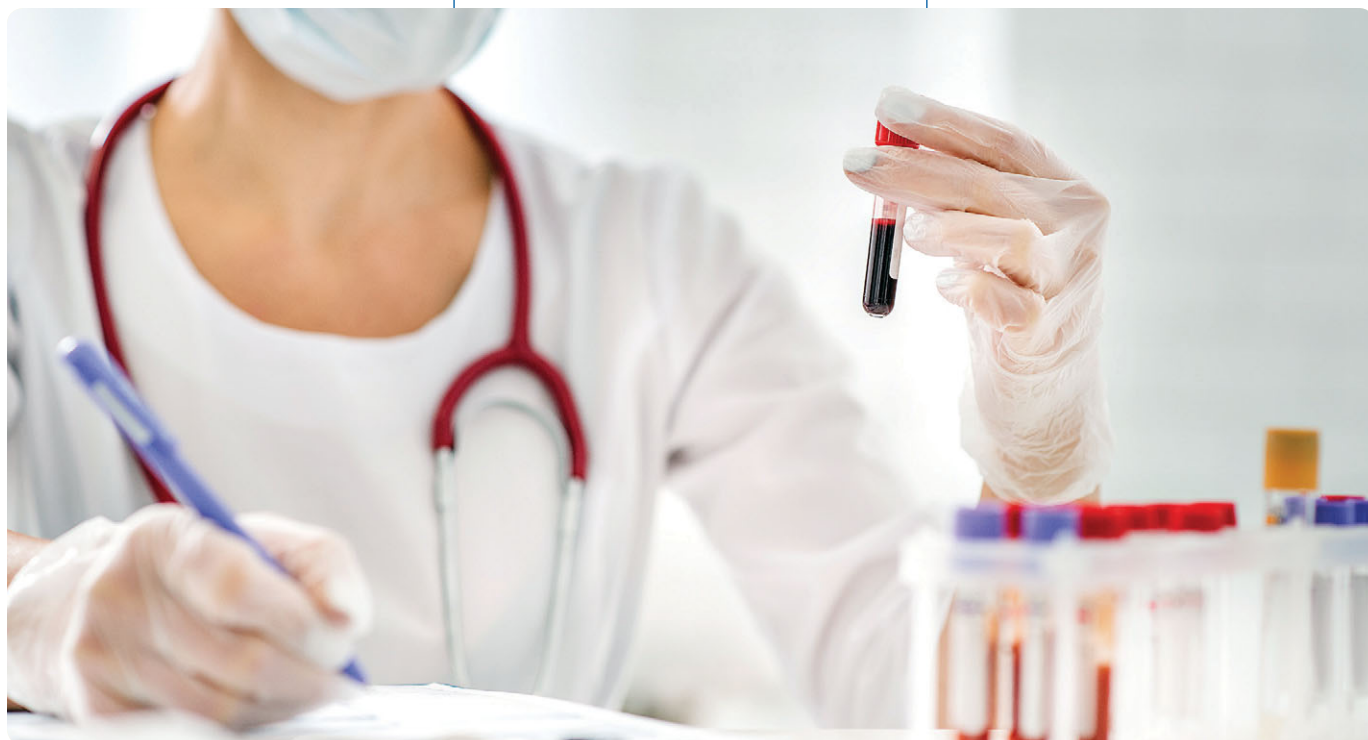
If your **homocysteine** levels are higher than optimal, which we opine is any blood reading significantly greater than **8 $\mu\text{mol/L}$** , please consider using the appropriate **B vitamins** to reduce it to safer ranges.

As we've advocated for the past four decades, reducing excess **homocysteine** will likely result in substantive public-health benefits in elderly population groups.

For longer life,



William Faloon,
Co-Founder, Life Extension®



References

1. McCully KS. Homocysteine, vitamins, and prevention of vascular disease. *Mil Med.* 2004;169(4):325-9.
2. Oikonomidi A, Lewczuk P, Kornhuber J, et al. Homocysteine metabolism is associated with cerebrospinal fluid levels of soluble amyloid precursor protein and amyloid beta. *J Neurochem.* 2016;139(2):324-32.
3. Smith AD, Refsum H. Homocysteine, B Vitamins, and Cognitive Impairment. *Annu Rev Nutr.* 2016;36:211-39.
4. Dam K, Fuchtemeier M, Farr TD, et al. Increased homocysteine levels impair reference memory and reduce cortical levels of acetylcholine in a mouse model of vascular cognitive impairment. *Behav Brain Res.* 2017;321:201-8.
5. Jerneren F, Elshorbagy AK, Oulhaj A, et al. Brain atrophy in cognitively impaired elderly: the importance of long-chain omega-3 fatty acids and B vitamin status in a randomized controlled trial. *Am J Clin Nutr.* 2015;102(1):215-21.
6. Oulhaj A, Jerneren F, Refsum H, et al. Omega-3 Fatty Acid Status Enhances the Prevention of Cognitive Decline by B Vitamins in Mild Cognitive Impairment. *J Alzheimers Dis.* 2016;50(2):547-57.
7. Caruso R, Campolo J, Sedda V, et al. Effect of homocysteine lowering by 5-methyltetrahydrofolate on redox status in hyperhomocysteinemia. *J Cardiovasc Pharmacol.* 2006;47(4):549-55.
8. Venn BJ, Green TJ, Moser R, et al. Comparison of the effect of low-dose supplementation with L-5-methyltetrahydrofolate or folic acid on plasma homocysteine: a randomized placebo-controlled study. *Am J Clin Nutr.* 2003;77(3):658-62.
9. Available at: <http://www.lifeextension.com/Magazine/2017/1/As-We-See-It/Page-01>. Accessed May 15, 2017.
10. Wolf PA, Abbott RD, Kannel WB. Atrial fibrillation as an independent risk factor for stroke: the Framingham Study. *Stroke.* 1991;22(8):983-8.
11. Hart RG, Pearce LA, Aguilar MI. Meta-analysis: antithrombotic therapy to prevent stroke in patients who have nonvalvular atrial fibrillation. *Ann Intern Med.* 2007;146(12):857-67.
12. Available at: <http://secure.medicalletter.org/w1492a>. Accessed May 15, 2017.
13. Spence JD. Homocysteine-lowering therapy: a role in stroke prevention? *Lancet Neurol.* 2007;6(9):830-8.
14. Selhub J, Jacques PF, Wilson PW, et al. Vitamin status and intake as primary determinants of homocysteinemia in an elderly population. *Jama.* 1993;270(22):2693-8.
15. Selhub J. The many facets of hyperhomocysteinemia: studies from the Framingham cohorts. *J Nutr.* 2006;136(6 Suppl):1726s-30s.
16. Xie Y, Feng H, Peng S, et al. Association of plasma homocysteine, vitamin B12 and folate levels with cognitive function in Parkinson's disease: A meta-analysis. *Neurosci Lett.* 2017;636:190-5.
17. Prinz-Langenohl R, Bramswig S, Tobolski O, et al. [6S]-5-methyltetrahydrofolate increases plasma folate more effectively than folic acid in women with the homozygous or wild-type 677C->T polymorphism of methylenetetrahydrofolate reductase. *Br J Pharmacol.* 2009;158(8):2014-21.
18. Jacques PF, Bostom AG, Williams RR, et al. Relation between folate status, a common mutation in methylenetetrahydrofolate reductase, and plasma homocysteine concentrations. *Circulation.* 1996;93(1):7-9.
19. McLean RR, Jacques PF, Selhub J, et al. Homocysteine as a predictive factor for hip fracture in older persons. *N Engl J Med.* 2004;350(20):2042-9.
20. Li P, Qin C. Methylenetetrahydrofolate reductase (MTHFR) gene polymorphisms and susceptibility to ischemic stroke: a meta-analysis. *Gene.* 2014;535(2):359-64.
21. Abd El-Aziz TA, Mohamed RH. Influence of MTHFR C677T gene polymorphism in the development of cardiovascular disease in Egyptian patients with rheumatoid arthritis. *Gene.* 2017;610:127-32.
22. Moll S, Varga EA. Homocysteine and MTHFR Mutations. *Circulation.* 2015;132(1):e6-e9.
23. Rathod R, Kale A, Joshi S. Novel insights into the effect of vitamin B(1)(2) and omega-3 fatty acids on brain function. *J Biomed Sci.* 2016;23:17.
24. Raszewski G, Lorocho M, Owoc A, et al. Homocysteine and cognitive disorders of postmenopausal women measured by a battery of computer tests--central nervous system vital signs. *Arch Womens Ment Health.* 2015;18(4):623-30.
25. "Mortality Among Centenarians in the United States 2000-2014"; Centers for Disease Control and Prevention; January/ July 2016. Available at: <https://www.cdc.gov/nchs/data/databriefs/db233.pdf>. Accessed May 16, 2017.
26. Duarte PO, Duarte MG, Pelichek A, et al. Cardiovascular risk factors and inflammatory activity among centenarians with and without dementia. *Aging Clin Exp Res.* 2016.
27. Raszewski G, Chwedorowicz R, Chwedorowicz A, et al. Homocysteine, antioxidant vitamins and lipids as biomarkers of neurodegeneration in Alzheimer's disease versus non-Alzheimer's dementia. *Ann Agric Environ Med.* 2016;23(1):193-6.
28. Kobe T, Witte AV, Schnelle A, et al. Vitamin B-12 concentration, memory performance, and hippocampal structure in patients with mild cognitive impairment. *Am J Clin Nutr.* 2016;103(4):1045-54.
29. Ars CL, Nijs IM, Marroun HE, et al. Prenatal folate, homocysteine and vitamin B12 levels and child brain volumes, cognitive development and psychological functioning: the Generation R Study. *Br J Nutr.* 2016:1-9.
30. White DJ, Cox KH, Peters R, et al. Effects of Four-Week Supplementation with a Multi-Vitamin/Mineral Preparation on Mood and Blood Biomarkers in Young Adults: A Randomised, Double-Blind, Placebo-Controlled Trial. *Nutrients.* 2015;7(11):9005-17.
31. Stampfer MJ, Malinow MR, Willett WC, et al. A prospective study of plasma homocyst(e)ine and risk of myocardial infarction in US physicians. *Jama.* 1992;268(7):877-81.
32. Nygard O, Nordrehaug JE, Refsum H, et al. Plasma homocysteine levels and mortality in patients with coronary artery disease. *N Engl J Med.* 1997;337(4):230-6.
33. Bonetti F, Brombo G, Magon S, et al. Cognitive Status According to Homocysteine and B-Group Vitamins in Elderly Adults. *J Am Geriatr Soc.* 2015;63(6):1158-63.
34. Yeh JK, Chen CC, Hsieh MJ, et al. Impact of Homocysteine Level on Long-term Cardiovascular Outcomes in Patients after Coronary Artery Stenting. *J Atheroscler Thromb.* 2016.
35. Zhang Z, Xu Z, Dai Y, et al. Elevated serum homocysteine level as an independent risk factor for erectile dysfunction: a prospective pilot case-control study. *Andrologia.* 2016.
36. Yao ES, Tang Y, Xie MJ, et al. Elevated Homocysteine Level Related to Poor Outcome After Thrombolysis in Acute Ischemic Stroke. *Med Sci Monit.* 2016;22:3268-73.
37. Brosnan JT, Jacobs RL, Stead LM, et al. Methylation demand: a key determinant of homocysteine metabolism. *Acta Biochim Pol.* 2004;51(2):405-13.
38. Selhub J. Homocysteine metabolism. *Annu Rev Nutr.* 1999;19:217-46.

**Refer to Next Page
For Description of
Homocysteine and
Related Blood Tests**

HOMOCYSTEINE Blood Test

Regular discount price is **\$54**.

Order by **August 31, 2017**, and get our comprehensive **CBC/Chemistry** panel at **NO charge**.

High homocysteine is associated with elevated risk of heart attack, stroke, and dementia. It's important to know if you have blood homocysteine at an unsafe level, so you can take steps to lower it.

Order a **homocysteine** test by **August 31st**, and you'll also receive, at **NO** extra charge, the **CBC/Chemistry** panel offered by **Life Extension[®]**. As you can see below, our **CBC/Chemistry** panel provides far more tests than most conventional labs.



Normally **\$35**, but **FREE** with a purchase of the **homocysteine** test, **Life Extension's CBC/Chemistry Panel** provides:

Lipid Profile:

- Total cholesterol
- Triglycerides
- HDL cholesterol
- LDL cholesterol (calc.)
- VLDL cholesterol (calc.)
- Total cholesterol/HDL ratio
- Estimated Coronary Heart Disease risk

Liver Function:

- Alkaline phosphatase
- LDH (lactate dehydrogenase)
- AST (aspartate aminotransferase)
- ALT (alanine transaminase)
- Total protein • Albumin • Globulin
- Albumin/globulin ratio • Bilirubin

Electrolytes and Minerals:

- Sodium • Potassium • Chloride
- Calcium • Phosphorus • Iron

Blood Sugar:

- Glucose

Kidney Function:

- Uric acid
- BUN (blood urea nitrogen)
- Creatinine
- BUN/creatinine ratio
- eGFR (estimated glomerular filtration rate)

Complete Blood Count:

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

To order a homocysteine blood test at our regular discount price of **\$54 (Item Code LC100061)** and receive a comprehensive **CBC/Chemistry** blood panel for **FREE**, call **Life Extension** today at **1-800-208-3444** or order online at **LifeExtension.com/homocysteine**

You'll be sent a list of drawing stations in your area along with a pre-paid requisition.

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You also have free access to our Wellness Specialists to help review your results.

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* J Diet Suppl. 2011 Jun; 8(2):158-68

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CoQ10 Improves Lipids and Glucose Metabolism

In a double-blind trial employing women with polycystic ovary syndrome (PCOS), supplementation with CoQ10 resulted in lower glucose, insulin, insulin resistance, and total and LDL cholesterol compared with a placebo group that did not receive CoQ10.*

Dr. Zatollah Asemi and colleagues randomized 60 women with PCOS to receive **100 mg** of CoQ10 or a placebo daily for 12 weeks. Blood samples collected before and after the treatment period were evaluated for serum lipid levels and markers of insulin metabolism.

Among CoQ10-supplemented participants, acne and hair loss, which are prominent features of PCOS, were reduced by the end of the trial compared with the placebo group. Women in the CoQ10 group had lower fasting plasma glucose, serum insulin and insulin resistance. Total cholesterol and LDL cholesterol were also reduced.

Editor's Note: Abnormal lipids affect an estimated **70%** of women with PCOS and insulin resistance is estimated to affect between **50%** and **75%**. In previous research, Dr. Asemi and colleagues found that **100 mg** of CoQ10 per day in subjects with metabolic syndrome improved markers of insulin metabolism.

* *Clin Endocrinol (Oxf)*. 2017 Apr;86(4):560-566.

Fasting Fights Leukemia

A recent study detailed findings that point to a potential benefit for every-other-day **fasting** in the treatment of the most common form of childhood leukemia.*

Cheng Cheng Zhang and his associates at the University of Texas Southwestern Medical Center found that alternate-day fasting inhibited the initiation of **B cell** as well as **T cell acute lymphoblastic leukemia** and reversed their progression in rodent models with the malignancy. Fasting was not, however, effective in acute myeloid leukemia, which occurs more frequently in adults.

“Strikingly, we found that in models of **T cell acute lymphoblastic leukemia**, a regimen consisting of six cycles of one day of fasting followed by one day of feeding completely inhibited cancer development,” Dr. Zhang reported. “Mice in the [**acute lymphoblastic leukemia**] model group that ate normally died within 59 days, while **75%** of the fasted mice survived more than 120 days without signs of leukemia.”

Editor’s Note: “It will be important to determine whether [**acute lymphoblastic leukemia**] cells can become resistant to the effects of fasting,” Dr. Zhang remarked. “It also will be interesting to investigate whether we can find alternative ways that mimic fasting to block [**acute lymphoblastic leukemia**] development.”

* *Nat Med.* 2017 Jan;23(1):79-90.

Vitamin D Deficiency can Lead to Metabolic Syndrome

Vitamin D deficiency has been found to play a central role in the development of metabolic syndrome—a group of risk factors that increases your risk for heart disease, stroke, and diabetes.*

For 18 weeks, Dr. Yuan-Ping Han and colleagues gave mice a control diet supplemented with a sufficient amount of vitamin D3, a vitamin D-deficient control diet, a high-fat diet supplemented with vitamin D3, or a high-fat diet that was deficient in vitamin D. The team found that a high-fat diet by itself is not sufficient to induce insulin resistance and fatty liver disease, but that “a second hit,” in the form of vitamin D deficiency, is required.

It was demonstrated that a high-fat diet alters gut bacteria, which contributes to elevated glucose and fatty liver. This imbalance is aggravated by a lack of vitamin D, which results in decreased production of antimicrobial molecules called *defensins* that are needed to maintain healthy flora.

“Based on this study, we believe that keeping vitamin D levels high...is beneficial for prevention and treatment of metabolic syndrome,” said coauthor Stephen Pandol of Cedars-Sinai Medical Center. “A sufficient dietary vitamin D supplement can partially but significantly antagonize metabolic syndrome caused by high-fat diet in mice.”

Editor's Note: In animals that received high fat, vitamin D deficient diets, oral administration of synthetic defensin improved intestinal bacteria balance.

* *Front Physiol.* 2016 Nov 15;7:498.

Iron Deficiency Associated With Hearing Loss

An article in *JAMA Otolaryngology-Head & Neck Surgery* reports an association between iron deficiency anemia and hearing loss.*

Kathleen Schieffer, BS, and colleagues evaluated data from 305,339 men and women between the ages of 21 and 90 who visited Penn State Milton S. Hershey Medical Center during 2011-2015 and had information available concerning serum ferritin and hemoglobin levels. Iron deficiency anemia was determined by low serum ferritin levels and low hemoglobin levels that were determined according to age and sex-defined values.

Hearing loss identified during past visits was categorized as conductive (associated with the bones of the middle ear), sensorineural, or combined loss (conductive and/or sensorineural loss, deafness or loss due to unspecified causes). Subjects who had iron deficiency anemia had **82% higher** odds of being diagnosed with sensorineural hearing loss and a greater than two-fold increased risk of combined hearing loss.

Editor's Note: The authors note that only one artery supplies blood to the cochlea of the ear, and that low hemoglobin levels that impair the blood's oxygen-carrying capacity can lead to ischemia in this area.

* *JAMA Otolaryngol Head Neck Surg.* 2017;143(4):350-354.

Nicotinamide Could Help With Early Onset Parkinson's Disease

Nicotinamide may have promising beneficial use in the treatment of early-stage Parkinson's disease.*

In a recent study, L. Miguel Martins and colleagues focused on fruit flies with a mutation, **PINK1**, that results in a condition similar to human Parkinson's disease. The flies were fed a diet supplemented with nicotinamide, which is a precursor to **nicotinamide adenine dinucleotide (NAD+)**, a coenzyme needed for the generation of energy in cells' mitochondria. NAD+ also helps protect neurons from degeneration.

Flies with the **PINK1** mutation that received nicotinamide had fewer faulty mitochondria and less neuron loss compared to those that did not receive the vitamin. Preventing depletion of **NAD+** in the brain resulted in healthier mitochondria, greater neuron survival, and longer life.

"The results suggest that in familial Parkinson's, available NAD+ is critical for keeping mitochondria in shape and the disease at bay," Dr. Martins concluded.

Editor's Note: "Parkinson's disease occurs when dopaminergic neurons in a part of the brain called the *substantia nigra* are lost," Dr. Martins explained. "This can happen for a variety of reasons, but in some hereditary cases, the main problem is unhealthy mitochondria—the organelles that power the cell."

"Mutations in genes such as **PINK1** prevent cells from clearing out the defective power-houses," he continued. "When they accumulate, neurons can't get enough energy and die. The faulty mitochondria also release toxic molecules that damage their genes encoded by DNA."

* *Biol Open*. 2017 Feb 15;6(2):141-147.

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References

1. *Altern Med Rev.* 2004 Jun;9(2):136-156.
2. *J Nutr Biochem.* 2003 May;14(5):251-8.
3. *Toxicol In Vitro.* 2003 Feb;17(1):27-33.
4. *Br J Nutr.* 2011 May;105(10):1465-70.
5. *Int J Sport Nutr Exerc Metab.* 2006 Oct;16(5):494-509.

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Revitalize AGING SKIN Using Advanced Therapeutics

Back in the **1980s**, a prescription cream used to treat **acne** was accidentally found to have **age-reversal** effects on the **skin**.

The brand name of this cream was **Retin-A®**. Its active ingredient (retinoic acid) was found to increase **collagen** production when applied topically.

Rather than depend on a **prescription cream** that carries warnings to avoid exposure to UV-light, researchers began experimenting with different potencies of a topical nutrient called **retinyl palmitate**.

They discovered that a **1.0%** concentration of **retinyl palmitate** enables noticeable **skin-cell renewal**. Clinical studies validate reduced **fine lines** and **wrinkles** when this highly-concentrated **retinyl palmitate** is applied daily.¹

Similar to prescription topical creams, **retinyl palmitate (1.0%)** converts to collagen-promoting **retinoic acid**, but without the exfoliating effects of Retin-A that force people to avoid sunlight.

A second complementary ingredient is a **0.5%** concentration of **oryza rice-bran ceramides**.

When applied topically, this special **ceramide** creates a protective barrier that retains skin **hydration** to further reduce **wrinkling**.²

In **human clinical trials**, scientists confirm impressive **skin rejuvenation** benefits when these two ingredients are used at these potencies.

The measurable effects include reduced fine lines and wrinkles as well as restoration of moisture. These studies were performed on sun damaged, time ravaged, aging skin.

Since skin is a living organ, it needs continuous **nourishment** to function at youthful capacity. Armed with data from successful trials, researchers identified additional **nutrients** that can stave off skin aging factors.

They discovered nutrients that “feed” the skin and complement the potent activity of **retinyl palmitate** and **oryza rice-bran ceramides**.

The upshot is a new skin “cocktail” that provides a broad spectrum of science-based restorative agents not found in any other skin-care program.



The Evolution of Skin Science

Our faces often reveal our age and the state of our health. Many people who have not cared for their skin can look much older than they are.

Skin rejuvenation utilizing clinically tested ingredients is transforming into **evidence-based** reality.

One group of scientists wrote: “**Active ingredients go well beyond simple moisturizers and exert a more complex activity in protecting skin...**”³

Reporting on visible skin restoration results, scientists writing in a dermatological journal concluded that certain nutrients used in advanced skin care are “**...closer to drugs in preventing and treating wrinkles.**”³

Innovative bioactive compounds have been identified that reduce underlying causes of skin degeneration. These compounds complement other established ingredients to:

- Increase cell renewal
- Enhance hydration
- Decrease oxidation/inflammation

Triggering Skin-Cell Renewal

1.0% Retinyl Palmitate

Often prescribed by dermatologists to revitalize tired, aging skin, **retinyl palmitate**, a vitamin A derivative, binds with specific skin-cell receptors to trigger **skin renewal**.

The potency of **1.0%** retinyl palmitate is almost impossible to find in commercial skin-care products, yet has been shown in human studies to **visibly reduce the signs of skin aging**.⁴

To test the age-reducing effects of topical application of **1.0%** retinyl palmitate, scientists conducted a clinical study on 67 female volunteers with **photodamaged**

skin. Participants were randomly assigned to receive a topical formula containing **retinyl palmitate** (with **vitamin E** and **moisturizers**) or no treatment. Every evening the treatment group applied the product to their faces, necks, décolletages, outer arms, and lower legs.⁴

After 12 weeks—compared to both the no-treatment group and to baseline—the face and neck areas of the treated women demonstrated **significant improvements in fine lines, coarse wrinkles, mottled pigmentation, uneven skin tone, roughness, firmness, and clarity** of the skin. The décolletage, arms, and lower-legs areas exhibited reduced levels of crepe-like skin texture, dryness, scaling, and roughness.⁴

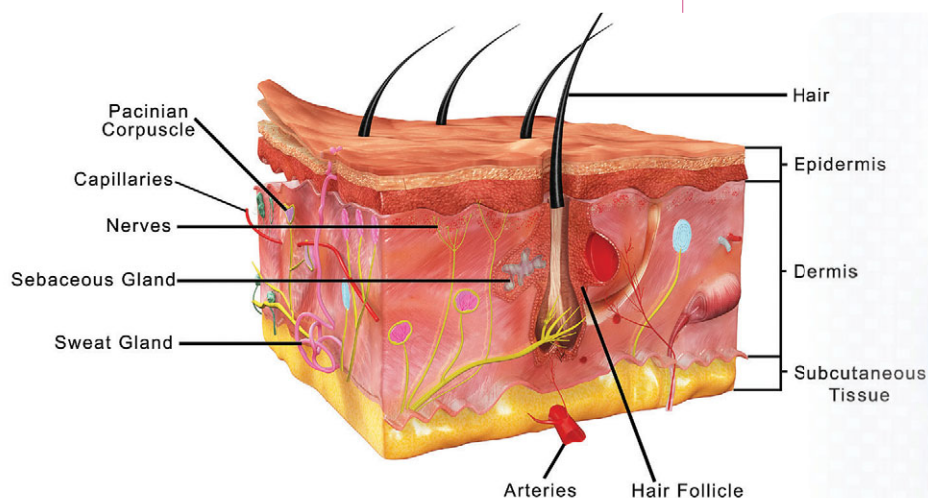
These impressive results would probably not have been possible with a lesser dose of retinyl palmitate. The **1.0%** amount is a recognized **clinical** dose.

Increase Skin Collagen

As we age, the skin's **protein** content *decreases*. Topical **retinyl palmitate** was shown in animal studies to *reverse* this trend. Scientists documented a **32% increase in skin protein** content and an impressive **128% increase in collagen**—the skin's main structural protein. Another result was a beneficial **thickening** of the protective **epidermis**.⁵

Unlike many other skin-care ingredients, **retinyl palmitate** easily penetrates the skin's epidermis, where it also boosts vitamin A content.^{6,7} The skin needs vitamin A for renewal and achieving a healthy and firm skin matrix. Generating increased vitamin A levels in the skin help it maintain youthful **regeneration**.⁸

To verify that retinyl palmitate increases vitamin A levels in the skin, researchers conducted a mouse study and found that a topically applied, **1.0%** concentration of **retinyl palmitate** increased the skin's content of vitamin A by more than **four-fold**.⁹



What You Need to Know



Skin Rejuvenation

- Dermatologists frequently prescribe **1.0% retinyl palmitate** to restore aging skin. It has been shown to generate cell renewal and reduce fine lines and wrinkles.
- Researchers have identified the benefits of **.5% oryza rice-bran ceramides** as a compound for restoring healthy hydration to the skin's surface and enabling the protective barrier.
- Seeking to employ the most innovative bioactive compounds for restoring youthful skin, researchers have employed ingredients such as beta-glucans, hyaluronic acid, green tea and raspberry extract to support healthy skin renewal and restore aging skin. This long list of ingredients complements the active work performed by **1% retinyl palmitate** and **oryza rice-bran ceramides** in revitalizing facial skin.

As a word of caution, be aware that many cosmetics use a similar ingredient called **retinol**, which can cause irritation and redness to the skin. However, **retinyl palmitate** is extremely well tolerated. For maximum effectiveness, it is best to use the clinically validated dosage of **1.0% retinyl palmitate**.

The Cosmetic Ingredient Review Expert Panel verified that a **1.0%** concentration of retinyl palmitate is a safe cosmetic agent.¹⁰

For restorative skin care, **1.0%** retinyl palmitate does the important work of generating skin renewal. When combined with **0.5%** oryza rice-bran ceramides, the skin is protected and freshened with vital moisture.

Enhance Hydration

0.5% Oryza Rice-Bran Ceramides

As skin ages, it becomes depleted of protective, waxy lipid molecules known as **ceramides**. The result is a *decrease* in **skin hydration** and protective-barrier function.¹¹ Wrinkles are more apparent when skin is dehydrated. Optimal hydration is a sign of youthful, vibrant skin.

In order to replace vital ceramides to the skin's surface, scientists have discovered a way to extract **ceramides** from **oryza rice bran**, making it ideal for improving skin health when applied topically.¹²

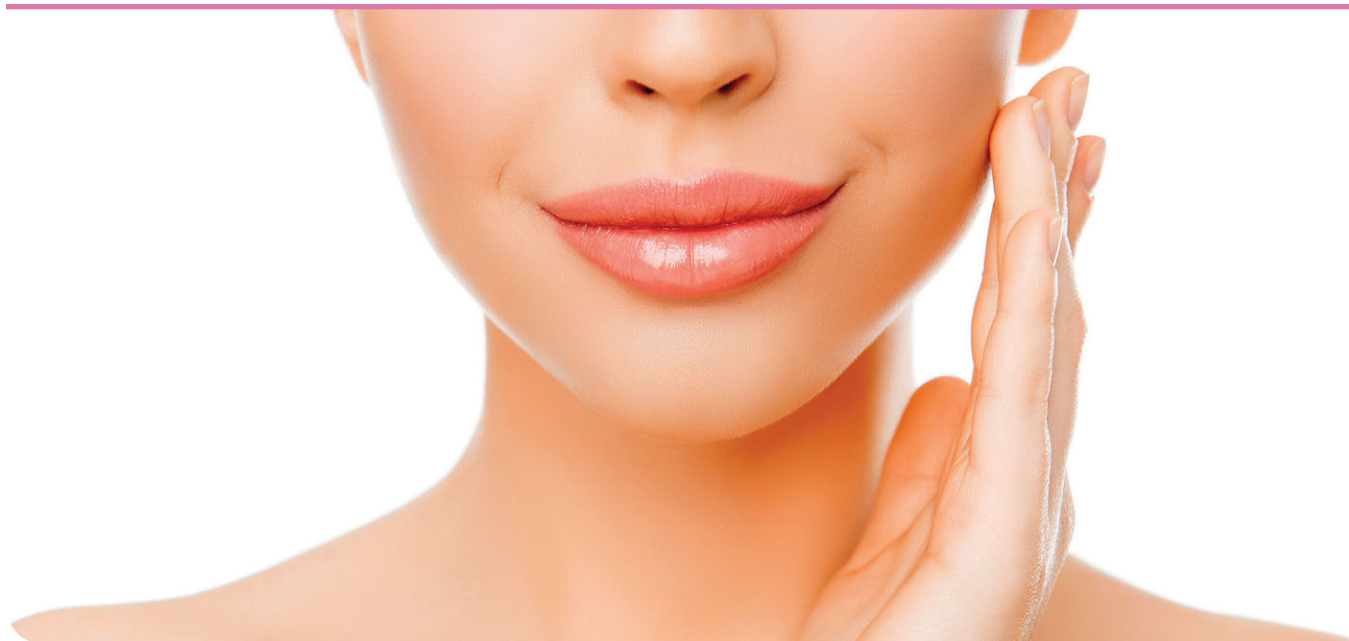
Rice-bran ceramides prevent water loss and contribute to the skin's protection against microbes and its protective barrier function.²

The effectiveness of **oryza rice-bran ceramides** was made clear in a three-week human study that applied either a **rice-derived ceramide** preparation or **placebo** to the skin of volunteers.

What the scientists found was important improvement to the moisture content of the skin. Those patients who applied the oryza rice-bran ceramide cream had better **hydrated** skin. In the study, those using the oryza rice-bran ceramides showed that **water** content in the outermost skin layer was boosted by **141%** compared to **111%** in placebo recipients. The water-loss rate was reduced to just **23%** of baseline among treated volunteers, compared to a loss rate of **39%** of baseline among placebo subjects.¹³

Another study looked at ceramides topically applied to the skin of children with **atopic dermatitis**. This is a condition in which skin dryness and inflammation mimic some elements of skin aging. The **ceramides** improved clinical symptoms by improving skin barrier function and ameliorating abnormalities.¹⁴

These topical rice-bran ceramides compliment the internal moisturizing effects of oral wheat-derived ceramides.



A Rejuvenating Peptide

Peptides are compounds that consist of two or more **amino acids**. The role of *specialized* peptides in reversing systemic aging processes is being rigorously investigated.

A 2015 published study identified a bioactive peptide called **hexapeptide-11** as having profound **anti-aging** properties when applied topically.¹⁵

Hexapeptide-11 was shown to **delay** markers of aging and enhance **elasticity** to yield **younger** looking skin.¹⁵

Applying a **serum** providing a **2.8%** concentration of **hexapeptide-11** under day or night creams provides a nourishing foundation for dermal **renewal**.

Complementary Ingredients for Healthy Skin

As researchers dug deeper into the treatment of skin aging, they found additional ingredients that complemented the work of both **retinyl palmitate 1.0%** and **0.5% oryza rice-bran ceramides**. By targeting different areas and mechanisms of skin aging, these researchers developed one of the most complete treatment programs against the numerous factors of skin aging. Following are the additional ingredients that they investigated and incorporated into the treatment program.

Hyaluronic Acid

Transdermal water loss increases with aging as skin becomes thinner.¹⁶⁻¹⁸ This moisture loss is accelerated by decreased levels of **hyaluronic acid**, which plays a role in the skin's supple and elastic properties.¹⁹

Our skin's natural content of hyaluronic acid is destroyed by enzymes such as **hyaluronidase** and **matrix metalloproteinases** (such as MMP-1). This loss of moisture contributes to biological skin aging.^{16,20,21}

Hyaluronic acid binds water molecules and provides a gelatinous matrix in which collagen fibers are embedded. This provides youthful skin suppleness.^{19,22} Production of **collagen** and **elastin**—proteins that provide skin elasticity—are also dependent on **hyaluronic acid**.²³

To fully document the impact of hyaluronic acid on skin moisture and flexibility, researchers enlisted 76 women, aged 30 to 60, to apply a **0.1%** hyaluronic-acid cream twice daily around one eye and a placebo cream around the other eye. After 60 days, the hyaluronic cream visibly demonstrated improvements in **hydration** and **elasticity**, with remarkable *reductions* in wrinkle depth and maximum roughness.²⁴

Beta-Glucans

Topically applied **beta-glucans** have been shown to help speed the healing of burn-induced tissue damage, in part by restoring depleted levels of oxidant-reducing compounds.²⁵

And, in clinical research, the use of beta-glucans has been shown to protect and even reverse skin wrinkling due to environmental exposure.²⁶

When applied topically, beta-glucans, derived from natural sources, also lock in valuable skin moisture. Beta-glucans are thought to penetrate deeper layers and circulate in the spaces between live skin cells (keratinocytes) and connective tissue cells (fibroblasts).

Scientists believe that beta-glucans stimulate fibroblasts to produce **procollagen** and **collagen** by stimulating the release of certain growth factors.²⁷ This action reverses some of the undesirable changes in skin associated with aging and cumulative sun damage—changes that are directly related to loss of collagen and procollagen.²⁸

Importance of Reducing Oxidation/Inflammation

The skin's ability to reduce harmful oxidation fades with age, causing accumulation of damaged cells that cannot be repaired and make skin appear tired and lifeless.

As the body's natural protection against oxidation diminishes, continuous contact with air, chemical, and radiation stresses result in a telltale photoaged appearance.²⁹⁻³¹

A string of scientific studies has identified nutrients that target the skin's reduced ability to fight off oxidation, which includes topical **vitamin C**, **vitamin E**, and **green tea extract**.

Vitamin C Targets UV Damage

Vitamin C is a well-recognized oxidation-decreasing nutrient. Numerous clinical trials have demonstrated its capacity to target both clinical and subjective signs of UV-damage to facial skin when applied topically.³²⁻³⁶

Vitamin E Inhibits Skin Damage

Vitamin E has a strong track record of inhibiting skin damage, including photoaging.³⁷

Despite its vital skin functions, vitamin E is found in decreased amounts in aging skin.³⁸

Topical vitamin E helps prevent photoaging, reduces inflammation-triggering fat oxidation, and mitigates the cancer-inducing impact of UV radiation.³⁷

Green Tea Reduces Age Acceleration

Polyphenol-rich **green tea** leaves naturally protect against UV radiation, as well as oxidative and other chemical stresses.

Cultured human skin cells treated with the pre-dominant **green tea polyphenol** (EGCG) produced substantially less of a “matrix-destroying” enzyme called MMP-1.

This demonstrated green tea's potential to prevent collagen degradation, which is a hallmark of premature skin aging.³⁹

In human volunteers, **topical green tea** protected skin from the damage and the impaired immune function that normally results from UV radiation—*independently* of any sunscreen-like effects.⁴⁰

Additional Compounds That Nourish Radiant Skin

Researchers scoured the literature and found that the following ingredients also provided benefits for obtaining youthful, vibrant skin.

- **DMAE** (dimethylaminoethanol) to smooth and firm skin,⁴⁶
- **Taurine** to inhibit premature aging,⁴⁷
- **Alpha Lipoic Acid** to inhibit the appearance of wrinkles,⁴⁸
- **Melatonin** to protect against UV-induced skin reddening and DNA damage,⁴⁹
- **Pomegranate** to protect against free radical- and radiation-induced skin damage,^{50,51}
- **Green Tea Leaf Extract** to protect against UV radiation,⁴⁰ and
- **Ginseng Root Extract** to inhibit wrinkle formation and increase skin moisture content.⁵²



Shea Butter for Essential Moisture

Shea butter is a vitamin E-rich fat extract of an African plant. It is a potent moisturizing agent.^{41,42} Research indicates that Shea butter ingredients provide significant UV protection.⁴³

Sunflower Seed Oil Enhances Hydration

Sunflower seed oil supports the integrity of the skin's stratum corneum—the outermost layer of the epidermis—and enhances hydration, as demonstrated in randomized clinical research.⁴⁴

Raspberry Extract Stimulates Ceramide Production

Raspberry plant extracts are rich in phenolic and oil-soluble compounds. These oil-soluble compounds are also critical components of the skin barrier. When tested on skin cells, raspberry extract induced **genes** responsible for skin hydration and production of hyaluronic acid, while stimulating expression of ceramide production.⁴⁵

How Much Repair Does Your Skin Require?

The rate your **skin ages** is highly individualistic. Choosing **ingredients** that best suit one's needs should be determined by the **damage** one seeks to reverse.

To promote **collagen renewal** that can help erase superficial lines and wrinkles, start off each **day** with a cream that provides clinical doses of **retinyl palmitate (1.0%)** and **rice ceramides (0.5%)**, along with **vitamins and plant extracts** to facilitate cell renewal.

This can be especially effective against **photo-damage**, which is a primary cause of premature facial aging.

Our body naturally undergoes systemic **repair** during sound sleep. To facilitate facial skin revitalization, researchers designed a **melatonin-rich** night cream that also provides **1.0% retinyl palmitate** and **0.5% rice ceramides**.

The effects of **nutrient-dense** day or night creams may be augmented by first applying an ultra-thin **serum** containing **2.8% hexapeptide-11** to promote skin elasticity and reduce various senescent factors.

To protect the entire body from environmental onslaughts, apply a **lotion** containing bioactive botanicals and vitamins to restore, hydrate and regenerate.

Summary

In their search for an effective, science-based topical application to reduce skin aging, scientists identified both **1.0% retinyl palmitate** and **0.5% oryza rice-bran ceramides** as a powerful approach to skin rejuvenation. Clinical studies verified the impact of these two ingredients on restoring aging skin.

In an effort to create the most complete skin-care product, researchers investigated and included a long list of complementary ingredients ranging from beta-glucans and hyaluronic acid to green tea, vitamin C, and raspberry extract.

The result is a major advance that works through multiple channels to preserve and restore the vitality of youthful skin. ●

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

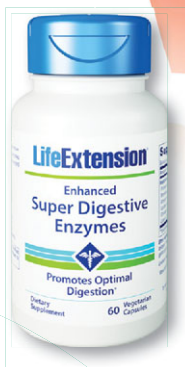
References

1. Mukherjee S, Date A, Patravale V, et al. Retinoids in the treatment of skin aging: an overview of clinical efficacy and safety. *Clin Interv Aging*. 2006;1(4):327-48.
2. Coderch L, Lopez O, de la Maza A, et al. Ceramides and skin function. *Am J Clin Dermatol*. 2003;4(2):107-29.
3. Rona C, Vailati F, Berardesca E. The cosmetic treatment of wrinkles. *J Cosmet Dermatol*. 2004;3(1):26-34.



4. Rawlings AV, Stephens TJ, Herndon JH, et al. The effect of a vitamin A palmitate and antioxidant-containing oil-based moisturizer on photodamaged skin of several body sites. *J Cosmet Dermatol.* 2013;12(1):25-35.
5. Counts DF, Skreko F, McBEE J. The effect of retinyl palmitate on skin composition and morphometry. *J. Soc. Cosmet. Chem.* 1988;39:235-40.
6. Yan J, Wamer WG, Howard PC, et al. Levels of retinyl palmitate and retinol in the stratum corneum, epidermis, and dermis of female SKH-1 mice topically treated with retinyl palmitate. *Toxicol Ind Health.* 2006;22(4):181-91.
7. Antille C, Tran C, Sorg O, et al. Penetration and metabolism of topical retinoids in ex vivo organ-cultured full-thickness human skin explants. *Skin Pharmacol Physiol.* 2004;17(3):124-8.
8. Available at: <http://lpi.oregonstate.edu/mic/health-disease/skin-health/vitamin-A>. Accessed May 31, 2017.
9. Yan J, Xia Q, Wamer WG, et al. Levels of retinyl palmitate and retinol in the skin of SKH-1 mice topically treated with retinyl palmitate and concomitant exposure to simulated solar light for thirteen weeks. *Toxicol Ind Health.* 2007;23(10):581-9.
10. CIR Expert Panel. Safety Assessment of Retinol and Retinyl Palmitate as Used in Cosmetics. Paper presented at: Cosmetic Ingredient Review. 2012.
11. Imokawa G, Abe A, Jin K, et al. Decreased level of ceramides in stratum corneum of atopic dermatitis: an etiologic factor in atopic dry skin? *J Invest Dermatol.* 1991;96(4):523-6.
12. Oryza Oil & Fat Chemical Co L. *Oryza Ceramide.* 2007.
13. Asai S, Miyachi H. Evaluation of skin-moisturizing effects of oral or percutaneous use of plant ceramides. *Rinsho Byori.* 2007;55(3):209-15.
14. Chamlin SL, Frieden IJ, Fowler A, et al. Ceramide-dominant, barrier-repair lipids improve childhood atopic dermatitis. *Arch Dermatol.* 2001;137(8):1110-2.
15. Skirrou AD, Ralli M, Dominguez M, et al. Hexapeptide-11 is a novel modulator of the proteostasis network in human diploid fibroblasts. *Redox Biol.* 2015;5:205-15.
16. Narurkar VA, Fabi SG, Bucay VW, et al. Rejuvenating Hydrator: Restoring Epidermal Hyaluronic Acid Homeostasis With Instant Benefits. *J Drugs Dermatol.* 2016;15(1 Suppl 2):s24-37.
17. Wilhelm KP, Cua AB, Maibach HI. Skin aging. Effect on transepidermal water loss, stratum corneum hydration, skin surface pH, and casual sebum content. *Arch Dermatol.* 1991;127(12):1806-9.
18. Luebberding S, Krueger N, Kerscher M. Age-related changes in skin barrier function - quantitative evaluation of 150 female subjects. *Int J Cosmet Sci.* 2013;35(2):183-90.
19. Sudha PN, Rose MH. Beneficial effects of hyaluronic acid. *Adv Food Nutr Res.* 2014;72:137-76.
20. Widgerow AD, Grekin SK. Effecting skin renewal: a multifaceted approach. *J Cosmet Dermatol.* 2011;10(2):126-30.
21. Papakonstantinou E, Roth M, Karakiulakis G. Hyaluronic acid: A key molecule in skin aging. *Dermatoendocrinol.* 2012;4(3):253-8.
22. Lee DH, Oh JH, Chung JH. Glycosaminoglycan and proteoglycan in skin aging. *J Dermatol Sci.* 2016;83(3):174-81.
23. Landau M, Fagien S. Science of Hyaluronic Acid Beyond Filling: Fibroblasts and Their Response to the Extracellular Matrix. *Plast Reconstr Surg.* 2015;136(5 Suppl):188s-95s.
24. Pavicic T, Gauglitz GG, Lersch P, et al. Efficacy of cream-based novel formulations of hyaluronic acid of different molecular weights in anti-wrinkle treatment. *J Drugs Dermatol.* 2011;10(9):990-1000.
25. Toklu HZ, Sener G, Jahovic N, et al. beta-glucan protects against burn-induced oxidative organ damage in rats. *Int Immunopharmacol.* 2006;6(2):156-69.
26. Du B, Bian Z, Xu B. Skin health promotion effects of natural beta-glucan derived from cereals and microorganisms: a review. *Phytother Res.* 2014;28(2):159-66.
27. Wei D, Zhang L, Williams DL, et al. Glucan stimulates human dermal fibroblast collagen biosynthesis through a nuclear factor-1 dependent mechanism. *Wound Repair Regen.* 2002;10(3):161-8.
28. Quan T, He T, Kang S, et al. Solar ultraviolet irradiation reduces collagen in photoaged human skin by blocking transforming growth factor-beta type II receptor/Smad signaling. *Am J Pathol.* 2004;165(3):741-51.
29. Puizina-Ivic N, Miric L, Carija A, et al. Modern approach to topical treatment of aging skin. *Coll Antropol.* 2010;34(3):1145-53.
30. Aghaei S, Nilforoushadeh MA, Aghaei M. The role of peroxisome proliferator-activated receptor-coactivator-1 gene in skin aging. *J Res Med Sci.* 2016;21:36.
31. Dreher F, Gabard B, Schwindt DA, et al. Topical melatonin in combination with vitamins E and C protects skin from ultraviolet-induced erythema: a human study in vivo. *Br J Dermatol.* 1998;139(2):332-9.
32. Fitzpatrick RE, Rostan EF. Double-blind, half-face study comparing topical vitamin C and vehicle for rejuvenation of photodamage. *Dermatol Surg.* 2002;28(3):231-6.
33. Humbert PG, Haftek M, Creidi P, et al. Topical ascorbic acid on photoaged skin. Clinical, topographical and ultrastructural evaluation: double-blind study vs. placebo. *Exp Dermatol.* 2003;12(3):237-44.
34. Burke KE. Photodamage of the skin: protection and reversal with topical antioxidants. *J Cosmet Dermatol.* 2004;3(3):149-55.
35. Sauermann K, Jaspers S, Koop U, et al. Topically applied vitamin C increases the density of dermal papillae in aged human skin. *BMC Dermatol.* 2004;4(1):13.
36. Traivovich SS. Use of topical ascorbic acid and its effects on photodamaged skin topography. *Arch Otolaryngol Head Neck Surg.* 1999;125(10):1091-8.
37. Rinnerthaler M, Bischof J, Streubel MK, et al. Oxidative stress in aging human skin. *Biomolecules.* 2015;5(2):545-89.
38. Rhie G, Shin MH, Seo JY, et al. Aging- and photoaging-dependent changes of enzymic and nonenzymic antioxidants in the epidermis and dermis of human skin in vivo. *J Invest Dermatol.* 2001;117(5):1212-7.
39. Kim JE, Shin MH, Chung JH. Epigallocatechin-3-gallate prevents heat shock-induced MMP-1 expression by inhibiting AP-1 activity in human dermal fibroblasts. *Arch Dermatol Res.* 2013;305(7):595-602.
40. Camouse MM, Domingo DS, Swain FR, et al. Topical application of green and white tea extracts provides protection from solar-simulated ultraviolet light in human skin. *Exp Dermatol.* 2009;18(6):522-6.
41. Olukemi OA, Oluseyi JM, Olukemi IO, et al. The Use of Selected Nigerian Natural Products in Management of Environmentally Induced Free Radical Skin Damage. *Pakistan Journal of Biological Sciences.* 2005;8(8):1074-7.
42. Maranz S, Wiesman Z. Influence of climate on the tocopherol content of shea butter. *J Agric Food Chem.* 2004;52(10):2934-7.
43. Suter F, Schmid D, Wandrey F, et al. Heptapeptide-loaded solid lipid nanoparticles for cosmetic anti-aging applications. *Eur J Pharm Biopharm.* 2016;108:304-9.
44. Danby SG, Alenezi T, Sultan A, et al. Effect of olive and sunflower seed oil on the adult skin barrier: implications for neonatal skin care. *Pediatr Dermatol.* 2013;30(1):42-50.
45. Tito A, Bimonte M, Carola A, et al. An oil-soluble extract of *Rubus idaeus* cells enhances hydration and water homeostasis in skin cells. *International Journal of Cosmetic Science.* 2015;37(6):588-94.
46. Grossman R. The role of dimethylaminoethanol in cosmetic dermatology. *Am J Clin Dermatol.* 2005;6(1):39-47.
47. Levis G, Inventor. Taurine-Based Compositions, Therapeutic Methods, and Assays. US patent US 20060127342A1. June 15, 2006, 2006.
48. Beitner H. Randomized, placebo-controlled, double blind study on the clinical efficacy of a cream containing 5% alpha-lipoic acid related to photoaging of facial skin. *Br J Dermatol.* 2003;149(4):841-9.
49. Fischer TW, Slominski A, Zmijewski MA, et al. Melatonin as a major skin protectant: from free radical scavenging to DNA damage repair. *Exp Dermatol.* 2008;17(9):713-30.
50. Jurenka JS. Therapeutic applications of pomegranate (*Punica granatum L.*): a review. *Altern Med Rev.* 2008;13(2):128-44.
51. Jadoon S, Karim S, Bin Asad MH, et al. Anti-Aging Potential of Phytoextract Loaded-Pharmaceutical Creams for Human Skin Cell Longevity. *Oxid Med Cell Longev.* 2015;2015:709628.
52. Hwang E, Park SY, Yin CS, et al. Antiaging effects of the mixture of *Panax ginseng* and *Crataegus pinnatifida* in human dermal fibroblasts and healthy human skin. *J Ginseng Res.* 2017;41(1):69-77.

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Enhance Erectile Function by Improving Vascular Health

Mention **erectile dysfunction** and most people think of Viagra® and similar drugs.

These drugs *temporarily* solve “sexual” problems for about half of men.¹

Aging men that visit their doctors to get erectile dysfunction drugs often have no idea what causes this condition.

Erectile dysfunction is an early symptom of **artery disease**. It can show up as a warning sign up to three years before a heart attack or stroke.²

Compelling research demonstrates that certain nutrients boost levels of **nitric oxide**, which relaxes blood vessels and enables efficient blood flow—the key to both overall vascular health *and* male sexual function.³⁻⁵

A study published in the **March 2017** issue of *Andrology* found that a significant proportion of erectile dysfunction patients have low levels of **L-arginine** (a nitric oxide precursor).⁶ Another recent study shows that supplementing with **L-arginine** and **pine-bark extract** significantly boosts erectile function.⁷

Fortunately, large doses of **arginine** are no longer needed. That’s because a **nitric oxide**-boosting equivalent can be obtained with a lower dose of the amino acid chelate, **L-arginine aspartate**.

These compounds have been shown in previous clinical trials to improve not only **erectile dysfunction**^{5,7,8} but also the underlying **cardio-vascular** cofactors.^{5,9}

Vascular Disease Results In Erectile Dysfunction

Male sexual dysfunction frequently results from underlying health issues, including prostatic disease, neurological damage, diabetes, metabolic syndrome, obesity, multiple sclerosis, medication side effects—and especially, **vascular occlusion**.¹⁰⁻¹⁴

In a study released online in April **2017** by the *American Journal of Hypertension*, 1,136 men (ages 45 to 84) were scored according to cardiovascular risk factors. A decade later, **58%** of the men with the **highest** cardiovascular disease risk had erectile dysfunction, compared with just **33%** of men with the **lowest** cardiovascular risk.¹⁴

Blood flow through the arteries and endothelial function (function of the inner arterial lining) are essential to sexual arousal.²

That's why erectile dysfunction should trigger an investigation for early indications of cardiovascular disease, such as comprehensive blood tests. But this is almost never the case.

First, many people don't bother to see a doctor about sexual dysfunction.¹⁵

Second, those who *do* are generally prescribed drugs without regard for underlying cofactors.

Pharmaceutical firms have persuaded the public and medical establishment that sexual symptoms are drug-treatable "diseases" instead of early-warning signs, so mainstream doctors seldom think to investigate further.

The fact is that erectile dysfunction, reduced libido, and loss of fertility are potential predictors of cardio-

vascular disease, which strikes epidemic numbers of aging individuals.^{2,16,17}

Unaware of these links, many men experiencing sexual difficulties seek prescriptions such as Viagra®, Cialis®, or Levitra®, that work by relaxing the smooth muscles lining the arteries, in turn increasing blood flow into the arteries that supply the penis.

These drugs provide only temporary effects, work for only about half of erectile dysfunction patients, cost as much as \$50 a pill without insurance,¹⁸ and are associated with side effects ranging from indigestion, flushing, visual disturbances, hearing loss, and headache. Rare but more serious problems include neurologic disorders and heart attack.¹⁹⁻²⁷

More critically, these drugs do not adequately treat an underlying cause of erectile dysfunction—**chronic endothelial dysfunction**.

Healthy endothelial cells release *nitric oxide synthase*, an enzyme that catalyzes production of **nitric oxide** from the amino acid **L-arginine**.

Nitric oxide triggers relaxation of the smooth muscle in the arteries of the penis, providing the adequate blood flow necessary for an erection. However, dysfunctional endothelial cells, disabled by plaque buildup, can no longer produce sufficient levels of nitric oxide synthase.²⁸

Thankfully, innovative scientists have identified three **natural** ingredients that *boost* endothelial function—simultaneously *enhancing* sexual capability and *protecting* against heart attack and stroke.



Restore Endothelial Health— and Sexual Potency

Scientists have studied three compounds that modulate the mechanisms underlying erectile dysfunction.

French maritime pine-bark extract and **L-arginine aspartate**—an amino acid chelate—work together to stimulate *nitric oxide synthase*, thus producing sufficient bioactive **nitric oxide** to induce and maintain an erection.⁵

Icariin—a flavonoid compound used in Chinese herbal medicine—further supports the ability to maintain an erection by blocking *phosphodiesterase-5*, the enzyme responsible for causing erections to subside.²⁹ This enzyme-blocking effect mimics the primary mechanism of *Viagra*®, which delivers no other benefit.

Compelling human trials demonstrate that this nutrient blend improves male sexual function *and* underlying vascular health through an array of health effects, delivering:

- Normal erectile function^{5,8,9}
- Enhanced sperm quality and quantity^{30,31}
- Elevated sexual interest³² and greater intercourse frequency⁵
- Enhanced sexual performance³²
- Lowered blood cholesterol levels,⁵ and
- Reduced blood pressure.^{5,9}

This combination may provide additional health benefits via stimulation of **nitric oxide** production.

Nitric oxide modulates the release of neurotransmitters³³ and acts as a neurotransmitter involved in long-term memory.³⁴⁻³⁷ It promotes a healthy immune function³⁸ and favorably modulates vascular tone, coagulation, and fibrinolysis.³⁹

Clinical Studies of French Maritime Pine-Bark Extract and Arginine

Scientists treated erectile dysfunction patients aged 25 to 45 with **L-arginine aspartate**.

After a month, only **5%** of patients had normal erections. In month two, however, **80 mg** of **French maritime pine-bark extract** was added to the regimen, and by month's end, a remarkable **80%** of men experienced normal erectile function.

In the third month, the pine-bark extract dosage was increased to **120 mg**, and at the end of that month, **92.5%** of participants achieved normal erectile function.⁸

What You Need to Know

Reversing Erectile Dysfunction via Vascular Support

- Painted by pharmaceutical firms as merely a “sexual problem,” erectile dysfunction is generally treated with costly drugs, such as *Viagra*®, that for some may temporarily alleviate these common symptoms of underlying vascular problems.
- Unfortunately, many aging men—and some doctors—are unaware that this condition is an early-warning symptom, appearing up to three years before a heart attack or stroke.
- An array of persuasive studies show that L-arginine—found in reduced levels in many erectile dysfunction patients—as well as French maritime pine-bark extract and the flavonoid icariin safely boost levels of nitric oxide, the blood flow-promoting key to both healthy male sexual function *and* overall vascular health.
- Research has shown that these three natural compounds improve both erectile dysfunction *and* underlying cardiovascular cofactors.



Beyond Erectile Dysfunction— Improving Sperm Quality

Double-blind, placebo-controlled studies demonstrate that French maritime pine-bark extract and L-arginine aspartate safely treat erectile dysfunction.^{5,7-9} But these natural nutrients have also been shown to improve **sperm quality** and fertility.

In a double-blind, placebo-controlled study, scientists evaluated the effects of French maritime **pine-bark extract** and **L-arginine aspartate** on spermatozoa parameters in 50 middle-aged men diagnosed with infertility. Sperm quality was markedly improved, with better results in younger men.³¹

In another double-blind, placebo-controlled study, researchers treated 50 infertile men for one month with either placebo or French maritime pine-bark extract and L-arginine aspartate. Compared with placebo treatment, these two compounds significantly increased:³⁰

- Semen volume,
- Concentration of spermatozoa,
- Percentage of motile spermatozoa, and
- Percentage of spermatozoa with normal morphology.

In one month, this dual-nutrient treatment restored the fertility index to normal values. After treatment was discontinued, the fertility index decreased again to infertile status. No adverse events were reported.³⁰



In a second clinical trial—a double-blind, placebo-controlled, crossover design—researchers examined 50 middle-aged men with mild to moderate erectile dysfunction. They treated them with placebo or with French maritime pine-bark extract and L-arginine aspartate. Participants recorded their degree of sexual function or dysfunction, and investigators monitored testosterone levels and endothelial *nitric oxide synthase* levels along with clinical chemistry.

These nutrients restored **erectile function** to normal and **doubled** intercourse frequency within one month. Nitric oxide synthase in spermatozoa and blood testosterone levels also increased significantly. When looking at the vascular effects of this nutrient combination, blood cholesterol and blood pressure decreased.⁵

In another double-blind study, patients with mild-to-moderate erectile dysfunction were treated with a supplement that delivered either a placebo or a daily dose of **60 mg** of French maritime pine-bark extract, **690 mg** of L-arginine, and **552 mg** of aspartic acid. The results were assessed using the **International Index of Erectile Function** test. Blood biochemistry, urinalysis, and salivary testosterone were also measured.

After eight weeks, there was marked improvement in the total erectile dysfunction score, including erection hardness, and satisfaction with sexual intercourse. Notably, there was a significant decrease in blood pressure and a slight boost in salivary testosterone—with no adverse reactions.⁹

A fourth clinical trial was conducted in **2015** on 47 patients with mild erectile dysfunction and abnormally low sperm numbers combined with low sperm motility and a low level of healthy-shaped sperm.

The men received daily doses of **60 mg** of French maritime pine-bark extract, **690 mg** of L-arginine, and **552 mg** of aspartic acid. Four months later, erectile dysfunction was “significantly ameliorated,” and average sperm concentration was notably increased. No unwanted effects were noticed or reported.⁷

Underscoring these effects, a **2017** study found that a significant proportion of erectile dysfunction patients have low levels of L-arginine. These levels were **17% lower** in men with complete erectile dysfunction. The authors concluded that low L-arginine levels may “**increase the erectile dysfunction risk by reducing the concentration of nitric oxide**,” which is essential to vascular health.⁶

These and other clinical studies further confirm the ability of French maritime pine-bark extract and L-arginine aspartate to restore erectile function,⁵ reverse low male fertility values by improving sperm quality^{30,31} and semen volume,³⁰ and double intercourse frequency.⁵



Icariin Sustains Erectile Function

Chinese medicine practitioners claim that **icariin**—a flavonoid extracted from plants in the *Epimedium* genus—produces aphrodisiac effects and restores erectile function.

Scientists agree that its multiple mechanisms of action suggest that icariin does support healthy erectile function.

Like Viagra®, Cialis®, and Levitra®, icariin blocks the action of the *enzyme* that causes erections to subside.^{29,40-42} Icariin also enhances the production of *nitric oxide* both in human endothelial cell culture and in animal models.⁴³⁻⁴⁵

Scientists have noted that icariin behaves similarly to testosterone—significant because testosterone is crucial for healthy sexual function.⁴⁶

Research found that *Epimedium* extracts improve erectile function in aged rats⁴⁷ and that icariin molecules enhance erectile function in diabetic rats by promoting **nitric oxide** production.⁴⁸

These multiple mechanisms suggest that icariin—like French maritime pine-bark extract and L-arginine—supports normal erectile function.

Summary

Many aging men with erectile dysfunction are deemed to have a “sexual disorder” and subsequently are prescribed costly drugs, such as Cialis®, that provide temporary relief for only about half of patients.

Erectile dysfunction, however, is one of the earliest symptoms of coronary artery disease, occurring up to three years before a heart attack.

Compelling research demonstrates that certain nutrients boost levels of **nitric oxide**, which relaxes blood vessels and enables efficient blood flow—critical for both healthy male sexual function *and* overall vascular health.

In **2017**, scientists demonstrated that a significant proportion of erectile dysfunction patients have low levels of L-arginine, which is needed to produce nitric oxide to promote blood flow.

Consistent research findings show that supplementing with **arginine** compounds, **pine-bark extract**, and the flavonoid **icariin** provides safe and rapid improvement not only in erectile dysfunction, but also in underlying cardiovascular cofactors. ●

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

References

1. Available at: <http://query.nytimes.com/gst/fullpage.html?res=9901E5DB163EF93AA1575BC0A96F9C8B63>. Accessed May 31, 2017.
2. Jackson G. Prevention of cardiovascular disease by the early identification of erectile dysfunction. *Int J Impot Res*. 2008;20 Suppl 2:S9-14.
3. Schoonees A, Visser J, Musekiwa A, et al. Pycnogenol(R) (extract of French maritime pine bark) for the treatment of chronic disorders. *Cochrane Database Syst Rev*. 2012(4):Cd008294.
4. Wu G, Meininger CJ. Nitric oxide and vascular insulin resistance. *Biofactors*. 2009;35(1):21-7.
5. Stanislavov R, Nikolova V, Rohdewald P. Improvement of erectile function with Prelox: a randomized, double-blind, placebo-controlled, crossover trial. *Int J Impot Res*. 2008;20(2):173-80.

6. Barassi A, Corsi Romanelli MM, Pezzilli R, et al. Levels of L-arginine and L-citrulline in patients with erectile dysfunction of different etiology. *Andrology*. 2017;5(2):256-61.
7. Kobori Y, Suzuki K, Iwahata T, et al. Improvement of seminal quality and sexual function of men with oligoasthenoteratozoospermia syndrome following supplementation with L-arginine and Pycnogenol(R). *Arch Ital Urol Androl*. 2015;87(3):190-3.
8. Stanislavov R, Nikolova V. Treatment of erectile dysfunction with pycnogenol and L-arginine. *J Sex Marital Ther*. 2003;29(3):207-13.
9. Aoki H, Nagao J, Ueda T, et al. Clinical assessment of a supplement of Pycnogenol(R) and L-arginine in Japanese patients with mild to moderate erectile dysfunction. *Phytother Res*. 2012;26(2):204-7.
10. Banks E, Joshy G, Abhayaratna WP, et al. Erectile dysfunction severity as a risk marker for cardiovascular disease hospitalisation and all-cause mortality: a prospective cohort study. *PLoS Med*. 2013;10(1):e1001372.
11. Fode M, Krogh-Jespersen S, Brackett NL, et al. Male sexual dysfunction and infertility associated with neurological disorders. *Asian J Androl*. 2012;14(1):61-8.
12. Diaz-Arjonilla M, Schwarcz M, Swerdloff RS, et al. Obesity, low testosterone levels and erectile dysfunction. *Int J Impot Res*. 2009;21(2):89-98.
13. Gregorian RS, Golden KA, Bahce A, et al. Antidepressant-induced sexual dysfunction. *Ann Pharmacother*. 2002;36(10):1577-89.
14. Lane-Cordova AD, Kershaw K, Liu K, et al. Association Between Cardiovascular Health and Endothelial Function With Future Erectile Dysfunction: The Multi-Ethnic Study of Atherosclerosis. *Am J Hypertens*. 2017.
15. Baldwin K, Ginsberg P, Harkaway RC. Under-reporting of erectile dysfunction among men with unrelated urologic conditions. *Int J Impot Res*. 2003;15(2):87-9.
16. Eisenberg ML, Li S, Cullen MR, et al. Increased risk of incident chronic medical conditions in infertile men: analysis of United States claims data. *Fertil Steril*. 2016;105(3):629-36.
17. Nascimento ER, Maia AC, Pereira V, et al. Sexual dysfunction and cardiovascular diseases: a systematic review of prevalence. *Clinics (Sao Paulo)*. 2013;68(11):1462-8.
18. Available at: <http://www.cbsnews.com/news/sex-erectile-dysfunction-drugs-viagra-cialis-addyi-medicines-cost/>. Accessed June 1, 2017.
19. Available at: <http://www.rxlist.com/viagra-side-effects-drug-center.htm>. Accessed May 31, 2017.
20. Lim PH, Moorthy P, Benton KG. The clinical safety of viagra. *Ann N Y Acad Sci*. 2002;962:378-88.
21. Blonde L. Sildenafil citrate for erectile dysfunction in men with diabetes and cardiovascular risk factors: a retrospective analysis of pooled data from placebo-controlled trials. *Curr Med Res Opin*. 2006;22(11):2111-20.
22. Laties AM. Vision disorders and phosphodiesterase type 5 inhibitors: a review of the evidence to date. *Drug Saf*. 2009;32(1):1-18.
23. Santaella RM, Fraunfelder FW. Ocular adverse effects associated with systemic medications: recognition and management. *Drugs*. 2007;67(1):75-93.
24. Bella AJ, Brant WO, Lue TF, et al. Non-arteritic anterior ischemic optic neuropathy (NAION) and phosphodiesterase type-5 inhibitors. *Can J Urol*. 2006;13(5):3233-8.
25. Mukherjee B, Shivakumar T. A case of sensorineural deafness following ingestion of sildenafil. *J Laryngol Otol*. 2007;121(4):395-7.
26. Choi HK, Ahn TY, Kim JJ, et al. A double-blind, randomised, placebo, controlled, parallel group, multicentre, flexible-dose escalation study to assess the efficacy and safety of sildenafil administered as required to male outpatients with erectile dysfunction in Korea. *Int J Impot Res*. 2003;15(2):80-6.
27. Kruuse C, Thomsen LL, Birk S, et al. Migraine can be induced by sildenafil without changes in middle cerebral artery diameter. *Brain*. 2003;126(Pt 1):241-7.
28. Huang PL. eNOS, metabolic syndrome and cardiovascular disease. *Trends Endocrinol Metab*. 2009;20(6):295-302.
29. Ning H, Xin ZC, Lin G, et al. Effects of icariin on phosphodiesterase-5 activity in vitro and cyclic guanosine monophosphate level in cavernous smooth muscle cells. *Urology*. 2006;68(6):1350-4.
30. Stanislavov R, Nikolova V, Rohdewald P. Improvement of seminal parameters with Prelox: a randomized, double-blind, placebo-controlled, cross-over trial. *Phytother Res*. 2009;23(3):297-302.
31. Nikolova V, Stanislavov R, Vatev I, et al. Sperm parameters in male idiopathic infertility after treatment with prelox. *Akush Ginekol (Sofia)*. 2007;46(5):7-12.
32. Available at: <http://www.touchendocrinology.com/sites/www.touchendocrinology.com/files/lamm.pdf>. Accessed June 1, 2017.
33. Prast H, Philippu A. Nitric oxide as modulator of neuronal function. *Prog Neurobiol*. 2001;64(1):51-68.
34. Schuman EM, Madison DV. A requirement for the intercellular messenger nitric oxide in long-term potentiation. *Science*. 1991;254(5037):1503-6.
35. Paul V, Ekambaram P. Involvement of nitric oxide in learning & memory processes. *The Indian Journal of Medical Research*. 2011;133(5):471-8.
36. Jacoby S, Sims RE, Hartell NA. Nitric oxide is required for the induction and heterosynaptic spread of long-term potentiation in rat cerebellar slices. *J Physiol*. 2001;535(Pt 3):825-39.
37. Hawkins RD, Son H, Arancio O. Nitric oxide as a retrograde messenger during long-term potentiation in hippocampus. *Prog Brain Res*. 1998;118:155-72.
38. Nussler AK, Billiar TR. Inflammation, immunoregulation, and inducible nitric oxide synthase. *J Leukoc Biol*. 1993;54(2):171-8.
39. Corseaux D, Olivier V, Fontaine V, et al. Hemostasis imbalance in experimental hypertension. *Mol Med*. 2002;8(4):169-78.
40. Jiang Z, Hu B, Wang J, et al. Effect of icariin on cyclic GMP levels and on the mRNA expression of cGMP-binding cGMP-specific phosphodiesterase (PDE5) in penile cavernosum. *J Huazhong Univ Sci Technol Med Sci*. 2006;26(4):460-2.
41. Xin ZC, Kim EK, Lin CS, et al. Effects of icariin on cGMP-specific PDE5 and cAMP-specific PDE4 activities. *Asian J Androl*. 2003;5(1):15-8.
42. Dell'Agli M, Galli GV, Dal Cero E, et al. Potent inhibition of human phosphodiesterase-5 by icariin derivatives. *J Nat Prod*. 2008;71(9):1513-7.
43. Xu HB, Huang ZQ. Icariin enhances endothelial nitric-oxide synthase expression on human endothelial cells in vitro. *Vascul Pharmacol*. 2007;47(1):18-24.
44. Tian L, Xin ZC, Liu WJ, et al. Effects of icariin on the erectile function and expression of nitrogen oxide synthase isoforms in corpus cavernosum of arteriogenic erectile dysfunction rat model. *Zhonghua Yi Xue Za Zhi*. 2004;84(11):954-7.
45. Liu WJ, Xin ZC, Xin H, et al. Effects of icariin on erectile function and expression of nitric oxide synthase isoforms in castrated rats. *Asian J Androl*. 2005;7(4):381-8.
46. Zhang ZB, Yang QT. The testosterone mimetic properties of icariin. *Asian J Androl*. 2006;8(5):601-5.
47. Makarova MN, Pozharitskaya ON, Shikov AN, et al. Effect of lipid-based suspension of Epimedium koreanum Nakai extract on sexual behavior in rats. *J Ethnopharmacol*. 2007;114(3):412-6.
48. Zhang J, Li AM, Liu BX, et al. Effect of icaridin II on diabetic rats with erectile dysfunction and its potential mechanism via assessment of AGEs, autophagy, mTOR and the NO-cGMP pathway. *Asian J Androl*. 2013;15(1):143-8.



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

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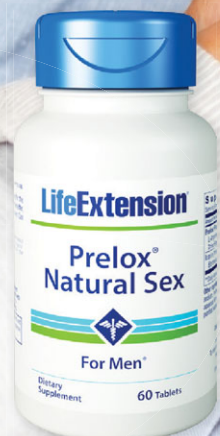
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References

1. *J Neurosci*. 2013 Jan 2;33(1):286-91.
2. *Psychol Med*. 2011 Feb;41(2):419-29.
3. *Am J Psychiatry*. 1998 Mar;155(3):344-9.
4. *J Altern Complement Med*. 2011 Jul;17(7):635-7.

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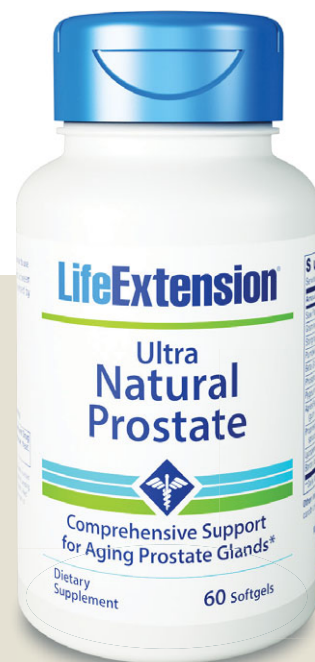
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BY MICHAEL HOLLAND





Avoid an Overlooked Cause of Stroke & Dementia

As we age, levels of a harmful amino acid known as **homocysteine** increase.

Research indicates that **homocysteine** can be a *major factor* in the creation of strokes and heart attacks as well as crippling dementia.^{1,2}

Lowering homocysteine can reduce one's risk for catastrophic events.¹⁻⁴

In the past few years, hundreds of papers on homocysteine and cardiovascular disease have been published. A February **2017** study stated that homocysteine levels are a powerful predictor of cardiovascular disorders.⁵

Homocysteine levels can be determined by a simple blood test and lowered with the proper forms of **B6** (pyridoxal 5-phosphate), **B12** (as methylcobalamin), **folate** (as 5-methyltetrahydrofolate), and **vitamin B2** (riboflavin-5-phosphate).⁶⁻¹⁷ It is important to ask yourself: When was the last time my doctor measured my **homocysteine** blood levels?

Optimizing homocysteine blood levels can be an important factor in reducing your risk of vascular disease and dementia.

An Overlooked Cardiovascular Risk Factor

Homocysteine levels rise as we **age**, a consequence of declining kidney function, B-vitamin deficiencies, and other factors such as impaired detoxification.¹⁸

Studies show that as many as **30%** of patients 71 or older are deficient in vitamin B12, a critical cofactor in the body's ability to naturally lower homocysteine.^{18,19} Deficiencies of B vitamins contribute to elevated homocysteine levels in up to **40%** of patients aged **80** or over.¹⁸

Elevated homocysteine levels set off a series of harmful processes that include oxidative stress, inflammation, increased risk of clotting (thrombosis), and damage to endothelial function in arteries.²⁰⁻²⁵

Together, these properties contribute to decreased blood flow to vital organs, particularly the **heart** and **brain**. This increases the risk of a sudden obstructive blood clot, which triggers heart attacks and strokes, while chronically reduced blood flow in the brain contributes to dementia and cognitive decline.

Data supporting the role of high homocysteine and cardiovascular risks are compelling.

Homocysteine Increases Heart Risks

Elevated homocysteine levels increase the risk of developing heart disease.

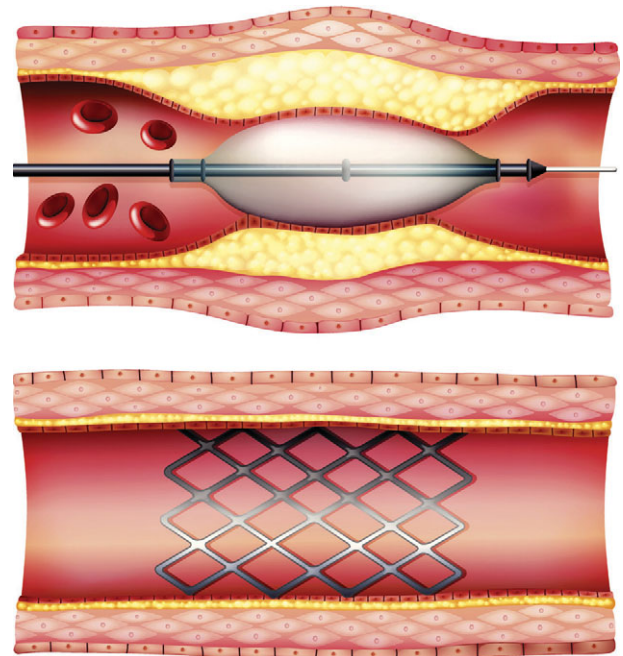
People with high homocysteine levels who also take the anticoagulant drug **warfarin** have a **23% increase** in their risk for cardiovascular events of all kinds, a **38% increase** in their risks of myocardial infarction (heart attack), and a **41% increase** in the risk of death from all causes.²⁶

Those same elevated risks apply to **ischemic stroke**—which is increased by **20%-32%** in people with elevated homocysteine.²⁴ These data make a strong argument for those taking **anticoagulant** drugs to optimize their homocysteine **blood level**.

Elevated homocysteine is associated with a **42%** increase in the risk of narrowing of the carotid arteries, the main blood suppliers to the brain.²⁷ That risk skyrockets to **189%** in patients with diabetes, a known aggravator of atherosclerosis and cardiovascular disease.²⁷ Carotid artery narrowing represents a major ischemic stroke risk.

People with excess homocysteine have a much higher risk for having **microscopic bleeding** that further contributes to the damage to brain tissue after a stroke. They also have an increased risk of poor outcomes even after being treated with “clot-busting” medications.²⁸

High homocysteine interferes with recovery from heart attacks as well, as shown by a study of survivors who had coronary artery stenting (insertion of a tiny



tube inside a blocked artery, see above). The people in this study with high homocysteine had a significant **30%** higher rate of major adverse cardiac events (death, another heart attack, stroke, or the need for additional surgery), compared to those with normal levels.²⁹

Additional Heart Risks

Studies show that people with high homocysteine are much more likely to have heart rhythm disturbances, especially **atrial fibrillation**, an irregular, often rapid heartbeat that causes poor blood flow.^{30,31} That's critical, because homocysteine promotes excessive blood clotting, while atrial fibrillation predisposes us to blood-clot formation, specifically in the heart's upper chambers (atria).^{18,32,33}

If an atrial clot breaks free and becomes lodged in another part of the body, such as the lungs, where it causes a pulmonary embolism, or the brain, where it causes a stroke, the results are devastating.

In fact, increased homocysteine levels **quadruple** one's risk for a **stroke** in the case of **atrial fibrillation**.¹⁸

Together, these data demonstrate the dangerous cardiovascular impact of the pro-clotting, pro-inflammatory, chemical stress-inducing homocysteine.

Let's now turn to the effects of this metabolic toxin on the brain, cognition, and memory.

Homocysteine and Dementia

Innovative physicians are beginning to recognize that elevated homocysteine is also a major factor in the development of a wide range of dementias.

Studies show that people with elevated homocysteine display cognitive problems and a nearly **100%** elevated risk of **dementia**, compared with those having normal levels.³⁴ A study of centenarians showed that individuals with normal cognitive function had lower homocysteine levels, compare with those having dementia.²¹

Both Alzheimer's and Parkinson's diseases—the leading causes of dementia in the aging population³⁵—have shown powerful associations with blood homocysteine levels, as have non-Alzheimer's dementias.³⁶⁻³⁹

Numerous studies have also found a clear link between high homocysteine levels and cognitive decline. For example, a **2016** meta-analysis pooling the results of 111 smaller studies showed that rising homocysteine levels correlate with cognitive decline, both in those with clear-cut dementias and the general population. This study emphasized that early detection of high homocysteine levels can be an important and effective test to prevent cognitive decline.⁴⁰

Elevated homocysteine levels have also been shown to be closely related to the risk of decline in a wide range of specific cognitive functions. These include executive function (needed for sorting, prioritizing, and decision-making), attention, cognitive flexibility, and memory.^{41,42}

In addition, people with elevated homocysteine levels suffer higher incidence of neurodegenerative conditions such as white-matter damage (leukoaraiosis), brain atrophy, accumulation of “junk proteins” like *beta-amyloid* that damage brain cells, and the resulting neurofibrillary tangles in brain cells.^{4,43,44}

These findings make homocysteine reduction increasingly important in the quest to sustain cognitive function into advancing years.^{37,40,45}

Effective Homocysteine-Reducing Therapy

Studies show that people with B vitamin dietary deficiencies are more likely to suffer from both cardiovascular and brain disorders, with the common connection being a resulting rise in homocysteine.^{39,46-49}

Numerous studies have demonstrated the benefit of supplementation with vitamins **B2**, **B6**, **B12**, and **folate** on homocysteine levels.^{10,50-56}

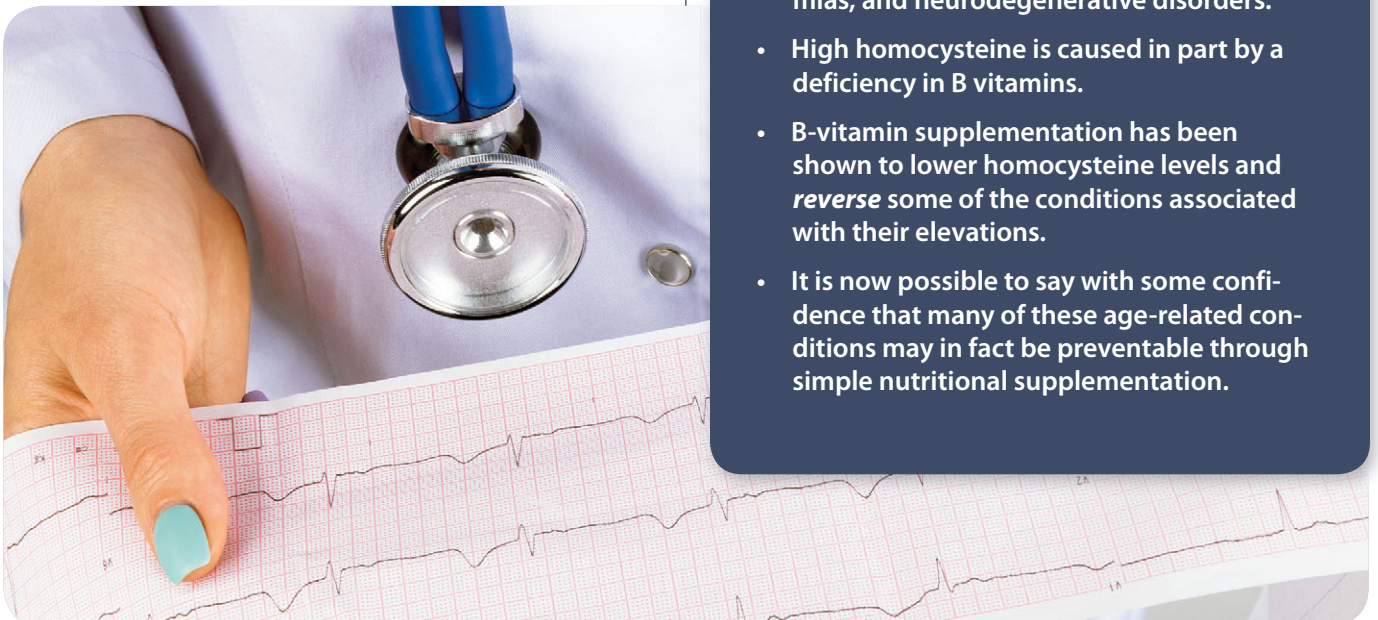
Vitamin B2, also called *riboflavin*, helps facilitate the benefits of folate, which in turn is required to detoxify homocysteine.⁵⁴ **Vitamin B6** and its active form, called *pyridoxal 5'-phosphate* is required for the conversion of homocysteine into less toxic molecules.⁵³ **Vitamin B12**, in the form of *methylcobalamin* has been shown to lower homocysteine levels.^{6,8} And **folate** in its active form, *5-methyltetrahydrofolate* or **5-MTHF**, is superior at raising serum folate levels,⁵⁷ which in turn translates into lower homocysteine levels.¹⁷

But while individual B vitamins can be effective for some, using a combination of these four key B vitamins provides an effective arsenal against elevated homocysteine levels.

What You Need to Know

B Vitamins Lower Homocysteine

- High levels of homocysteine are associated with risks for numerous age-related disorders, such as heart attacks, strokes, arrhythmias, and neurodegenerative disorders.
- High homocysteine is caused in part by a deficiency in B vitamins.
- B-vitamin supplementation has been shown to lower homocysteine levels and **reverse** some of the conditions associated with their elevations.
- It is now possible to say with some confidence that many of these age-related conditions may in fact be preventable through simple nutritional supplementation.



Large meta-analysis studies suggest that lowering blood homocysteine levels by **25%** would reduce the risk of coronary heart disease by up to **16%** and the risk of stroke by up to **24%**. These studies also indicate that we must find the optimum combination of B vitamins to achieve those results, because each vitamin has a specific role to play regarding homocysteine balance.¹⁰

For example, it has now been shown that both **riboflavin** and **folate** must be present in ample quantities for **optimal** homocysteine-lowering.^{10,54,55} Yet some

Life Extension Lab Data Show Shockingly High Homocysteine Levels

Life Extension scientists recently conducted an independent evaluation of homocysteine levels among **Life Extension** customers, including over 67,000 individual blood tests performed between January 2012 and April 2017.

Even using conservative levels to define excess homocysteine (**>12 µmol/L**), almost one quarter (**23%**) of individuals had high levels. While using a more aggressive cutoff, in line with many recent publications, nearly half (**47%**) showed dangerous homocysteine elevations of **>10 µmol/L**.

And if one uses **Life Extension's** longstanding position that levels should be **<8 µmol/L**, **77%** had higher-than-optimal levels.

Other findings from this study comport with published literature, showing that homocysteine elevations are most prominent among **men** and among older people.

These remarkable figures drive home the point that high homocysteine levels represent a massive problem, and that we are not yet doing enough, collectively, to protect ourselves from preventable age-related diseases.

Readers should respond to this finding by arranging for a homocysteine **blood test** and starting on the following **B vitamins** that support homocysteine detoxification:

- Folate as *5-MTHF*, **1,000 to 10,000 mcg**
- Vitamin B6 as *pyridoxal 5'-phosphate*, **100 to 200 mg**
- Vitamin B12 as *methylcobalamin*, **300 to 1,000 mcg**
- Vitamin B2 as *riboflavin-5-phosphate*, **25 to 100 mg**

studies have shown that even people whose folate and riboflavin status has been restored by supplementation may not significantly lower high homocysteine levels until **vitamin B6** is added to the equation.⁵³

Research shows that healthy adults that use mixed B-vitamin supplementation consistently show improvement in homocysteine status and reduction of associated oxidative stress.^{52,56}

Similar actions in the brain provide further evidence favoring mixed B-vitamin supplementation.

In patients who had recently suffered a stroke or near-strokes (transient ischemic attacks), supplementation significantly reduced the volume of brain white-matter *hyperintensities* (tiny markers of damage also called *leukoaraiosis*) in patients with the most severe lesions at baseline.⁵⁰

Even more compelling data comes from a study of gray matter atrophy, which is shrinkage of the main “thinking” portions of the brain as seen in Alzheimer’s disease. In this study, elderly subjects with **mild cognitive impairment** (at increased risk for Alzheimer’s) who received B vitamins for 2 years experienced a slowing of brain shrinkage compared with placebo.⁵¹

Importantly, in those subjects, supplementation reduced shrinkage of brain areas especially vulnerable to Alzheimer’s damage by up to **7-fold**.⁵¹

Summary

A growing body of scientific evidence points clearly to the fact that some of our most feared age-related disorders can be prevented simply by lowering homocysteine levels.

High circulating homocysteine imposes enormous chemical stresses on tissues throughout the body, and raises our risks for heart attacks, arrhythmias, strokes, and neurodegenerative conditions.

A host of new studies is finding that B vitamin supplementation at ample doses can lower homocysteine levels and **reverse** some of the conditions associated with their elevations.

It’s also clear that assuring adequate **omega-3** status in the blood potentiates the beneficial effects of B-vitamin supplementation.

With proper nutrition, some of the leading causes of death and disability can be prevented or at least decelerated—good news for all of us.

Homocysteine levels should be part of a yearly battery of blood tests to ensure a healthy, long life. **Life Extension®** advises that one should target their homocysteine levels below **10 µmol/L** with optimal numbers being **<7-8 µmol/L**.

Conventional reference ranges do not flag a homocysteine problem until blood levels reach **15 µmol/L**.

Published data reveal those with **homocysteine** blood levels between **10-15 umol/L** suffer greater vascular risks.

Individuals with elevated homocysteine levels should begin supplementation with key B vitamins, especially higher doses of the activated form of folate (**5-MTHF**), and retest homocysteine blood levels after three months. ●

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

References

1. Karczyn AD. Homocysteine, stroke, and dementia. *Stroke*. 2002;33(10):2343-4.
2. Ganguly P, Alam SF. Role of homocysteine in the development of cardiovascular disease. *Nutr J*. 2015;14:6.
3. Jerneren F, Elshorbagy AK, Oulhaj A, et al. Brain atrophy in cognitively impaired elderly: the importance of long-chain omega-3 fatty acids and B vitamin status in a randomized controlled trial. *Am J Clin Nutr*. 2015;102(1):215-21.
4. Smith AD, Refsum H. Homocysteine, B Vitamins, and Cognitive Impairment. *Annu Rev Nutr*. 2016;36:211-39.
5. Bickel C, Schnabel RB, Zengin E, et al. Homocysteine concentration in coronary artery disease: Influence of three common single nucleotide polymorphisms. *Nutr Metab Cardiovasc Dis*. 2017;27(2):168-75.
6. Kim HI, Hyung WJ, Song KJ, et al. Oral vitamin B12 replacement: an effective treatment for vitamin B12 deficiency after total gastrectomy in gastric cancer patients. *Ann Surg Oncol*. 2011;18(13):3711-7.
7. Koyama K, Usami T, Takeuchi O, et al. Efficacy of methylcobalamin on lowering total homocysteine plasma concentrations in haemodialysis patients receiving high-dose folic acid supplementation. *Nephrol Dial Transplant*. 2002;17(5):916-22.
8. Naseri M, Sarvari GR, Esmaeili M, et al. High doses of oral folate and sublingual vitamin B12 in dialysis patients with hyperhomocysteinemia. *J Renal Inj Prev*. 2016;5(3):134-9.
9. Koyama K, Ito A, Yamamoto J, et al. Randomized controlled trial of the effect of short-term coadministration of methylcobalamin and folate on serum ADMA concentration in patients receiving long-term hemodialysis. *Am J Kidney Dis*. 2010;55(6):1069-78.
10. McNulty H, Doweley le RC, Strain JJ, et al. Riboflavin lowers homocysteine in individuals homozygous for the MTHFR 677C->T polymorphism. *Circulation*. 2006;113(1):74-80.
11. Vitamin B6 (pyridoxine and pyridoxal 5'-phosphate) - monograph. *Altern Med Rev*. 2001;6(1):87-92.
12. Selhub J, Jacques PF, Wilson PW, et al. Vitamin status and intake as primary determinants of homocysteinemia in an elderly population. *JAMA*. 1993;270(22):2693-8.
13. Hara J, Shankle WR, Barrentine LW, et al. Novel Therapy of Hyperhomocysteinemia in Mild Cognitive Impairment, Alzheimer's Disease, and Other Dementing Disorders. *J Nutr Health Aging*. 2016;20(8):825-34.
14. 5-methyltetrahydrofolate. Monograph. *Altern Med Rev*. 2006;11(4):330-7.
15. Lamers Y, Prinz-Langenohl R, Moser R, et al. Supplementation with [6S]-5-methyltetrahydrofolate or folic acid equally reduces plasma total homocysteine concentrations in healthy women. *Am J Clin Nutr*. 2004;79(3):473-8.
16. Litynski P, Loehrer F, Linder L, et al. Effect of low doses of 5-methyltetrahydrofolate and folic acid on plasma homocysteine in healthy subjects with or without the 677C->T polymorphism of methylenetetrahydrofolate reductase. *Eur J Clin Invest*. 2002;32(9):662-8.



Do Omega-3 Fatty Acids Enhance B-Vitamin Benefits?

B vitamins help lower homocysteine levels, thereby reducing the risks of homocysteine-related diseases, including cardiovascular and neurological diseases.

Further analysis of an earlier trial reveals two new studies that have found that blood levels of omega-3 fats, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), are important contributing factors to successful B-vitamin therapy.^{3,58}

Both studies evaluated patients with mild cognitive impairment (MCI) at the start of the study, and followed them for two years to determine the combined impact of B-vitamin supplementation and omega-3 blood levels.

Both studies found better results in supplemented subjects overall, but not in every individual.

In one study, the outcome of interest was brain shrinkage, or atrophy.³ It found that, among the B-vitamin-supplemented patients with higher levels of combined **EPA** and **DHA**, the rate of brain shrinkage was significantly (**40%**) slower, compared with placebo recipients.³

The other study's outcome measure was cognitive decline, and B-vitamin-supplemented subjects were again evaluated according to their omega-3 levels.⁵⁸

Here, scores on memory, cognition, and dementia rating improved in the B-vitamin-supplemented subjects according to their baseline omega-3 levels, with a particularly strong effect for levels of DHA.⁵⁸

The bottom line?

Supplement with the recommended higher-dose B vitamins **and with** ample omega-3 fats from fish oil to optimize brain protection and slow brain aging.

17. Venn BJ, Green TJ, Moser R, et al. Comparison of the effect of low-dose supplementation with L-5-methyltetrahydrofolate or folic acid on plasma homocysteine: a randomized placebo-controlled study. *Am J Clin Nutr*. 2003;77(3):658-62.
18. Spence JD. Increased Coagulation With Aging: Importance of Homocysteine and Vitamin B12. *Circ J*. 2017;81(2):268.
19. Spence JD. Nutrition and stroke prevention. *Stroke*. 2006;37(9):2430-5.
20. Chen D, Wei X, Zou J, et al. Contra-Directional Expression of Serum Homocysteine and Uric Acid as Important Biomarkers of Multiple System Atrophy Severity: A Cross-Sectional Study. *Front Cell Neurosci*. 2015;9:247.
21. Duarte PO, Duarte MG, Pelicheck A, et al. Cardiovascular risk factors and inflammatory activity among centenarians with and without dementia. *Aging Clin Exp Res*. 2016.
22. Harrison SL, de Craen AJ, Kerse N, et al. Predicting Risk of Cognitive Decline in Very Old Adults Using Three Models: The Framingham Stroke Risk Profile; the Cardiovascular Risk Factors, Aging, and Dementia Model; and Oxi-Inflammatory Biomarkers. *J Am Geriatr Soc*. 2017;65(2):381-9.
23. Qin LZ, Li W, Huang Y, et al. PTX3 expression in the plasma of elderly ACI patients and its relationship with severity and prognosis of the disease. *Eur Rev Med Pharmacol Sci*. 2016;20(19):4112-8.
24. Shoamanesh A, Preis SR, Beiser AS, et al. Circulating biomarkers and incident ischemic stroke in the Framingham Offspring Study. *Neurology*. 2016;87(12):1206-11.
25. Spence JD. Homocysteine lowering for stroke prevention: Unraveling the complexity of the evidence. *Int J Stroke*. 2016;11(7):744-7.
26. Lind M, Jansson JH, Nilsson TK, et al. High homocysteine and low folate plasma concentrations are associated with cardiovascular events but not bleeding during warfarin treatment. *Clin Chem Lab Med*. 2016;54(12):1981-6.
27. Jia J, Wang A, Wang J, et al. Homocysteine and Its Relationship to Asymptomatic Carotid Stenosis in a Chinese Community Population. *Sci Rep*. 2016;6:37361.
28. Yao ES, Tang Y, Xie MJ, et al. Elevated Homocysteine Level Related to Poor Outcome After Thrombolysis in Acute Ischemic Stroke. *Med Sci Monit*. 2016;22:3268-73.
29. Yeh JK, Chen CC, Hsieh MJ, et al. Impact of Homocysteine Level on Long-term Cardiovascular Outcomes in Patients after Coronary Artery Stenting. *J Atheroscler Thromb*. 2016.
30. Shi D, Meng Q, Zhou X, et al. Factors influencing the relationship between atrial fibrillation and artery stiffness in elderly Chinese patients with hypertension. *Aging Clin Exp Res*. 2016;28(4):653-8.
31. Yao Y, Yao W, Bai R, et al. Plasma homocysteine levels predict early recurrence after catheter ablation of persistent atrial fibrillation. *Europace*. 2017;19(1):66-71.
32. Undas A, Brozek J, Szczeklik A. Homocysteine and thrombosis: from basic science to clinical evidence. *Thromb Haemost*. 2005;94(5):907-15.
33. Edirisinghe SP. Homocysteine-induced thrombosis. *Br J Biomed Sci*. 2004;61(1):40-7.
34. Bonetti F, Brombo G, Magon S, et al. Cognitive Status According to Homocysteine and B-Group Vitamins in Elderly Adults. *J Am Geriatr Soc*. 2015;63(6):1158-63.
35. Spencer B, Potkar R, Trejo M, et al. Beclin 1 gene transfer activates autophagy and ameliorates the neurodegenerative pathology in alpha-synuclein models of Parkinson's and Lewy body diseases. *J Neurosci*. 2009;29(43):13578-88.
36. Chen WW, Cheng X, Zhang X, et al. The expression features of serum Cystatin C and homocysteine of Parkinson's disease with mild cognitive dysfunction. *Eur Rev Med Pharmacol Sci*. 2015;19(16):2957-63.
37. Grant WB. Using Multicountry Ecological and Observational Studies to Determine Dietary Risk Factors for Alzheimer's Disease. *J Am Coll Nutr*. 2016;35(5):476-89.
38. Raszewski G, Chwedorowicz R, Chwedorowicz A, et al. Homocysteine, antioxidant vitamins and lipids as biomarkers of neurodegeneration in Alzheimer's disease versus non-Alzheimer's dementia. *Ann Agric Environ Med*. 2016;23(1):193-6.
39. Xie Y, Feng H, Peng S, et al. Association of plasma homocysteine, vitamin B12 and folate levels with cognitive function in Parkinson's disease: A meta-analysis. *Neurosci Lett*. 2017;636:190-5.
40. Setien-Suero E, Suarez-Pinilla M, Suarez-Pinilla P, et al. Homocysteine and cognition: A systematic review of 111 studies. *Neurosci Biobehav Rev*. 2016;69:280-98.
41. Raszewski G, Lorocho M, Owoc A, et al. Homocysteine and cognitive disorders of postmenopausal women measured by a battery of computer tests--central nervous system vital signs. *Arch Womens Ment Health*. 2015;18(4):623-30.
42. Polito L, Poloni TE, Vaccaro R, et al. High homocysteine and epistasis between MTHFR and APOE: association with cognitive performance in the elderly. *Exp Gerontol*. 2016;76:9-16.
43. Wu MK, Lu YT, Huang CW, et al. Clinical Significance of Cerebrovascular Biomarkers and White Matter Tract Integrity in Alzheimer Disease: Clinical correlations With Neurobehavioral Data in Cross-Sectional and After 18 Months Follow-ups. *Medicine (Baltimore)*. 2015;94(28):e1192.
44. Oikonomidi A, Lewczuk P, Kornhuber J, et al. Homocysteine metabolism is associated with cerebrospinal fluid levels of soluble amyloid precursor protein and amyloid beta. *J Neurochem*. 2016;139(2):324-32.
45. Ansari Z. Homocysteine and Mild Cognitive Impairment: Are These the Tools for Early Intervention in the Dementia Spectrum? *J Nutr Health Aging*. 2016;20(2):155-60.
46. Araujo JR, Martel F, Borges N, et al. Folate and aging: Role in mild cognitive impairment, dementia and depression. *Ageing Res Rev*. 2015;22:9-19.
47. Zhang Y, Hodgson NW, Trivedi MS, et al. Decreased Brain Levels of Vitamin B12 in Aging, Autism and Schizophrenia. *PLoS One*. 2016;11(1):e0146797.
48. Porter K, Hoey L, Hughes CF, et al. Causes, Consequences and Public Health Implications of Low B-Vitamin Status in Ageing. *Nutrients*. 2016;8(11).
49. Towfighi A, Arshi B, Markovic D, et al. Homocysteine-lowering therapy and risk of recurrent stroke, myocardial infarction and death: the impact of age in the VISP trial. *Cerebrovasc Dis*. 2014;37(4):263-7.
50. Cavalieri M, Schmidt R, Chen C, et al. B vitamins and magnetic resonance imaging-detected ischemic brain lesions in patients with recent transient ischemic attack or stroke: the VITamins TO Prevent Stroke (VITATOPS) MRI-substudy. *Stroke*. 2012;43(12):3266-70.
51. Douaud G, Refsum H, de Jager CA, et al. Preventing Alzheimer's disease-related gray matter atrophy by B-vitamin treatment. *Proc Natl Acad Sci U S A*. 2013;110(23):9523-8.
52. Harris E, Macpherson H, Pipingas A. Improved blood biomarkers but no cognitive effects from 16 weeks of multivitamin supplementation in healthy older adults. *Nutrients*. 2015;7(5):3796-812.
53. McKinley MC, McNulty H, McPartlin J, et al. Low-dose vitamin B-6 effectively lowers fasting plasma homocysteine in healthy elderly persons who are folate and riboflavin replete. *Am J Clin Nutr*. 2001;73(4):759-64.
54. Moat SJ, Ashfield-Watt PA, Powers HJ, et al. Effect of riboflavin status on the homocysteine-lowering effect of folate in relation to the MTHFR (C677T) genotype. *Clin Chem*. 2003;49(2):295-302.
55. Tavares NR, Moreira PA, Amaral TF. Riboflavin supplementation and biomarkers of cardiovascular disease in the elderly. *J Nutr Health Aging*. 2009;13(5):441-6.
56. White DJ, Cox KH, Peters R, et al. Effects of Four-Week Supplementation with a Multi-Vitamin/Mineral Preparation on Mood and Blood Biomarkers in Young Adults: A Randomised, Double-Blind, Placebo-Controlled Trial. *Nutrients*. 2015;7(11):9005-17.
57. Willems FF, Boers GH, Blom HJ, et al. Pharmacokinetic study on the utilisation of 5-methyltetrahydrofolate and folic acid in patients with coronary artery disease. *Br J Pharmacol*. 2004;141(5):825-30.
58. Oulhaj A, Jerneren F, Refsum H, et al. Omega-3 Fatty Acid Status Enhances the Prevention of Cognitive Decline by B Vitamins in Mild Cognitive Impairment. *J Alzheimers Dis*. 2016;50(2):547-57.

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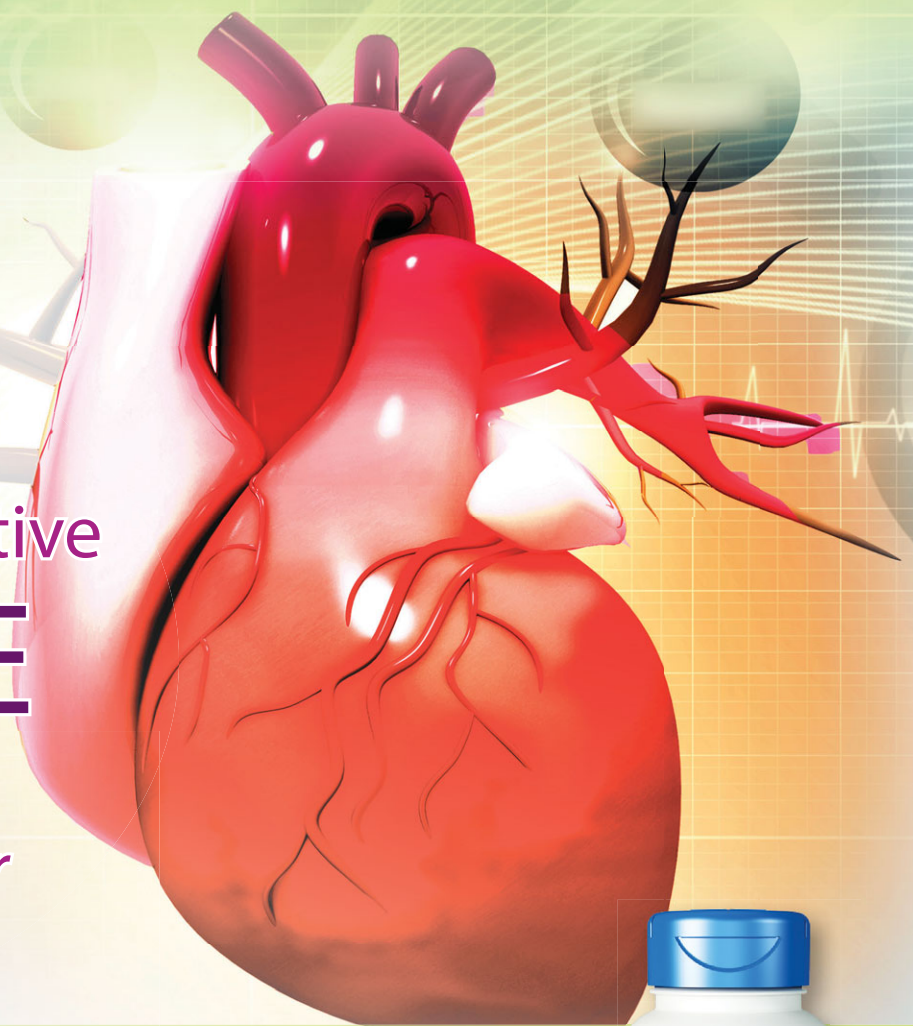
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References

1. *Am J Clin Nutr.* 2006 Apr;83(4):842-50.
2. *Am J Ther.* 2014; Epub Nov 17.
3. *Innov Clin Neurosci.* 2011 Jan;8(1):19-28.
4. *Am J Hum Genet.* 2002 Mar;70(3):758-62.
5. *Coll Antropol.* 2004 Dec;28(2):647-54.
6. *Br J Pharmacol.* 2004 Mar;141(5):825-30.

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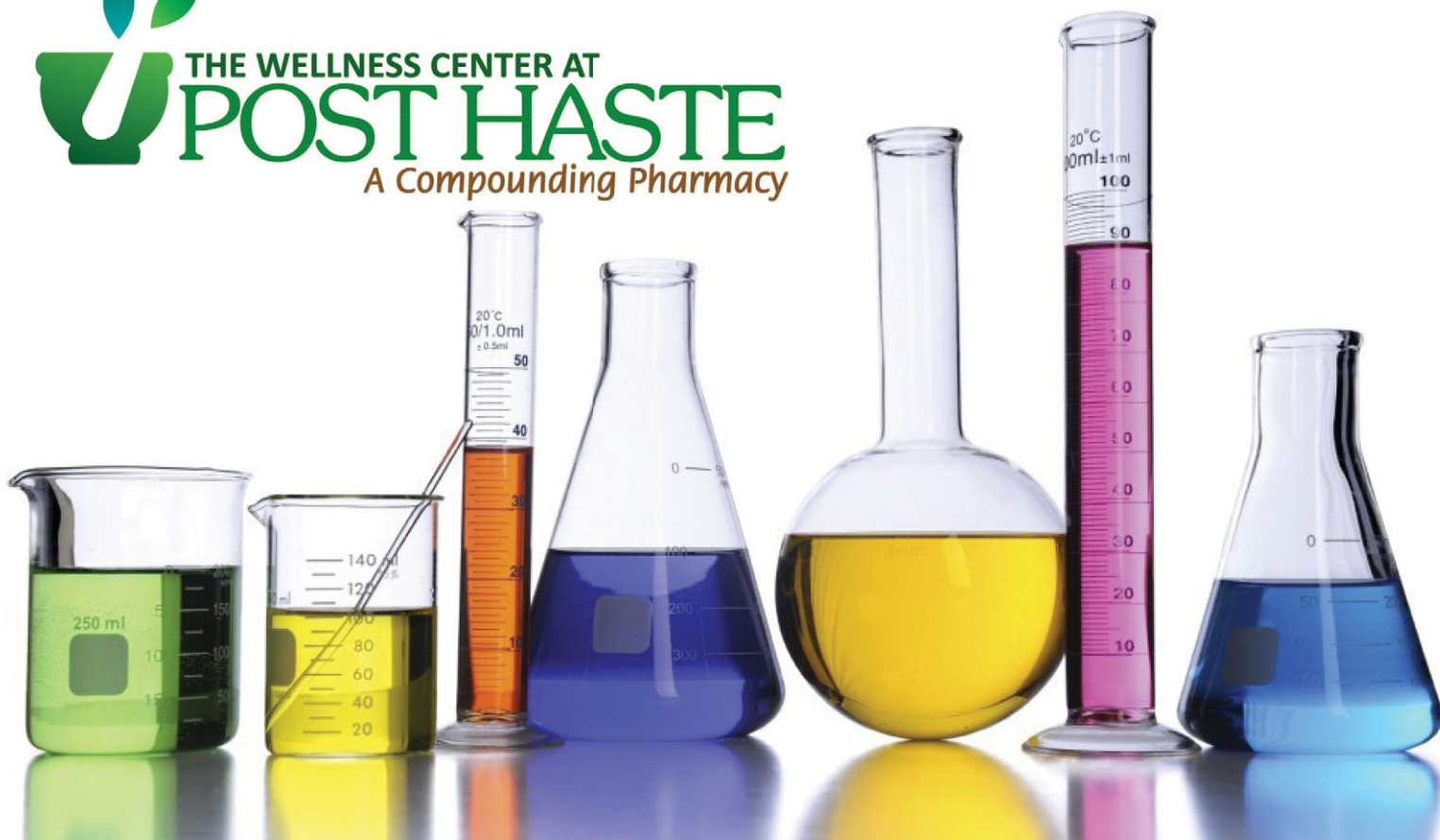
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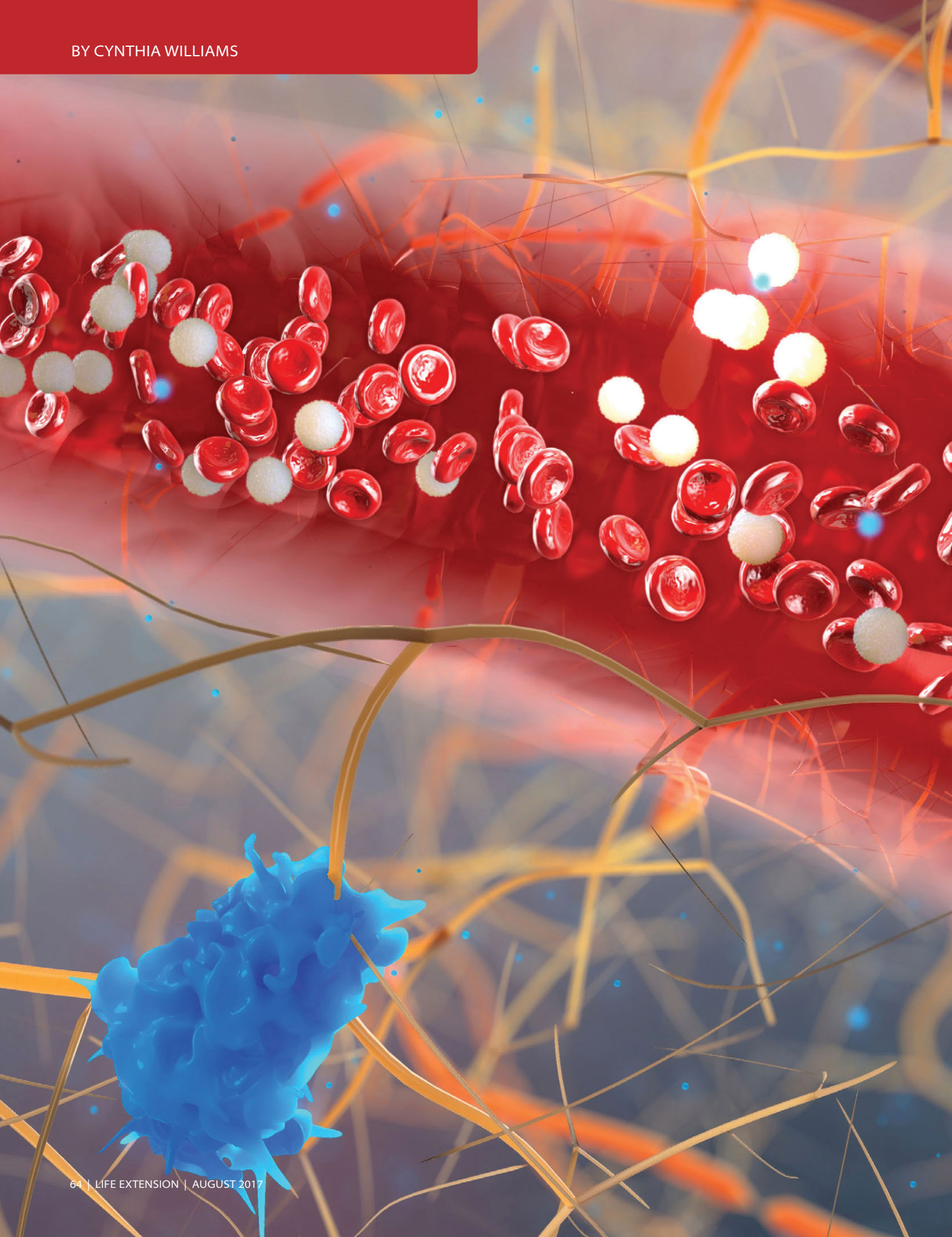
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Targeted Blood-Sugar Control

A staggering number of Americans suffer from a disorder called “**metabolic syndrome**” that is characterized by a combination of:¹

- High blood sugar
- Increased blood pressure
- Abdominal obesity
- Abnormal cholesterol and triglyceride levels

Those with **metabolic syndrome** are at increased risk for heart attack, stroke, type II diabetes and early death.²

A root cause of metabolic syndrome is **insulin resistance**.^{2,3}

This article describes **natural substances** that work together to promote healthy fasting **blood sugar** and **insulin sensitivity**.

In the United States there are **86 million** adults with **prediabetes**.⁴ A substantial number of those with poor **glucose control** convert to full-blown **type II diabetes**. Before diabetes is diagnosed, chronically elevated **glucose** damages tissues throughout the body.

The Power of Prevention

Insulin resistance means the body's cells cannot respond normally to insulin. That causes blood sugar levels to creep up gradually – entirely without symptoms in most people.

In those with prediabetes or insulin resistance, risk of progression to type II diabetes can be reduced by about **58%** with lifestyle interventions, including diet, that lower blood-sugar levels.² In addition, studies have identified multitargeted nutrients capable of reducing blood glucose via a variety of mechanisms.

Cinnamon Acts on Multiple Glucose Targets

Cinnamon is an effective tool for lowering blood sugar and reducing the risk of type II diabetes.

A **water-soluble, oil-free cinnamon extract** has been identified that has demonstrated beneficial effects on blood sugar, glycation, and metabolic syndrome.^{5,6} The **US Department of Agriculture** filed a patent application on this extract based on its glucose-lowering properties.^{7,8}



One of the primary ways **cinnamon** impacts **blood sugar** is by increasing production of **GLUT4**, a molecule that is responsible for transporting sugar from blood plasma into the cell, which enhances insulin sensitivity and therefore glucose uptake.⁹⁻¹¹

Without effective GLUT4 transporters, sugar levels in the blood steadily rise, eventually producing damage to tissues through the chemical reaction known as **glycation**, in which glucose molecules bind to vital proteins, deleteriously altering both their structure and function.¹²

Increased production of **PPARs** is another critical mechanism of some antidiabetic drugs.¹³ When activated, PPARs promote insulin sensitivity and glucose uptake. PPARs also suppress fat accumulation and glucose production.¹³⁻¹⁵

Clinical trials have shown that cinnamon supplementation boosts insulin sensitivity and lowers blood sugar.¹⁶⁻²⁰ Cinnamon also helps to induce satiety, the feeling of fullness after a meal that prevents us from overeating.²¹ Together, these effects have been shown to reduce evidence of long-term glucose overexposure in blood, as measured by hemoglobin A1C, a measure of chronic exposure to sugar.²²

Cinnamon has other properties that help combat metabolic syndrome, such as lowering blood pressure and improving body fat distribution.^{23,24} Cinnamon has also shown that it could reduce disruptions associated with *non-alcoholic fatty liver disease*, the liver manifestation of metabolic syndrome.^{25,26}

Lower Blood Sugar With Chromium

Another nutrient that improves blood-sugar levels and insulin sensitivity is **chromium**.

Studies show there is a powerful connection between chromium and diabetes. For example, people with diabetes and heart disease are relatively deficient in chromium levels, compared with healthy people. And people with known chromium deficiencies develop symptoms associated with type II diabetes.²⁷⁻³³

Human studies show chromium's impact on both short- and long-term blood-sugar control. When diabetic patients receive chromium supplements, their fasting blood glucose and insulin levels drop *promptly*, while their long-term sugar levels improve, as indicated by reductions in hemoglobin A1C.^{34,35}

Unlike glucose-lowering drugs and insulin, chromium poses **no danger** of producing dangerously low blood sugar (hypoglycemia), which is a major advance in safety.^{36,37}



What You Need to Know

Targeted Blood-Sugar Control

- More than a third of Americans suffer from metabolic syndrome, which raises their risks of heart disease, stroke, diabetes, cancer, and other life-shortening conditions.
- Metabolic syndrome has many components, but scientists agree that a root cause is insulin resistance.
- Physicians rarely prescribe sugar-lowering drugs to anyone who is not already diabetic, placing millions of Americans at real risk for a host of life-threatening complications.
- Six natural compounds have been shown to work independently and together to prevent blood sugar increases, to enhance insulin sensitivity, and combat the effects of the occasional carbohydrate overindulgence.
- Chromium, amla, shilajit, cinnamon, iodine, and seaweed promote healthy blood sugar levels and prevent insulin resistance through a wide variety of related and complementary mechanisms.
- Any adult, even those with normal blood sugar levels, should consider regular supplementation with these nutrients, to prevent or slow the age-accelerating effects of borderline or high blood sugar by increasing insulin sensitivity, decreasing fasting blood sugar and preventing the effects of the occasional carbohydrate indulgence.

Chromium works in multiple ways to boost glucose uptake from the blood.³⁸ It boosts *production* of **GLUT4** transporter molecules, and triggers the GLUT4 movement from the cell's interior to its membrane—both of which help move glucose out of the blood and into cells.³⁹⁻⁴² This has the dual benefit of lowering blood-sugar levels while providing much-needed chemical energy inside cells.

These glucose uptake-promoting properties mean that chromium fights insulin resistance by enhancing the impact of insulin on a cell's sugar-absorbing capabilities—and that's a very good thing for anyone with borderline or high blood sugar.

Ancient Remedies Prevent Tissue Damage

While chromium produces **outstanding** sugar-lowering effects, it is also a highly reactive metal ion that is capable of inducing oxidative stress that could damage tissue. That's why scientists now recommend that chromium supplements be **stabilized** with organic compounds that can reduce the oxidative stress and allow chromium's major benefits to emerge. Two such compounds are **amla** and **shilajit**.



In addition to enhancing chromium's benefits, these two ancient natural remedies have some impressive protective properties of their own that make them a perfect complement to chromium.

Modern science has revealed that **amla extracts** powerfully oppose oxidative stress of all kinds. Amla protects against *glycation* of proteins, which helps prevent the damage that otherwise occurs in tissues throughout the body (eye lens and retina, heart muscle, kidney, nerves, and blood vessels).^{43,44} Amla also directly prevents blood-sugar levels from rising after a starch-containing meal by blocking the enzymes that convert starch into sugar in the intestine.⁴³ This can help to prevent the effects of the occasional carbohydrate overindulgence and may also help address unhealthy fasting blood-sugar levels.

Shilajit is an **adaptogen** that helps cells and tissues survive oxidative and other stresses.⁴⁵ Research shows that shilajit promotes efficient glucose “burning” in mitochondria.⁴⁶

Efficient-running mitochondria produce fewer chemically stressful byproducts, reducing cell damage. Their energy output is also maximal, helping cells to meet their needs.⁴⁷ And clean-burning mitochondria are less vulnerable to outside oxidative stress.^{48,49}

Studies show that amla and shilajit provide the tissue protection that is not found in many pharmaceutical drugs.^{50,51}

Providing supplemental chromium stabilized with amla and shilajit is an effective, safe way of lowering blood sugar, minimizing glucose-induced tissue damage, and promoting efficient energy production—all of which are known to mitigate prediabetes and diabetes.

An Underlying Cause of Insulin Resistance

Insulin resistance, a crucial factor in the development of prediabetes, occurs when the body's cells cannot respond normally to insulin. That causes blood sugar levels to creep up gradually—and, in most people, entirely without symptoms.⁷⁴

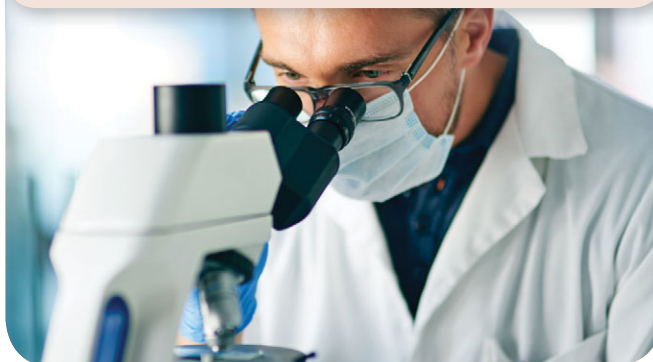
One of the key dysfunctions in developing insulin resistance is a reduction in movement of **glucose-transporting molecules** from deep within a cell out to its membrane. These transporters, known as **GLUT4**, are responsible for transferring sugar from blood plasma into the cell. Once there, its chemical energy is released to keep the cell working.⁷⁵⁻⁷⁷

Without adequate transportation out of the blood and into the cells, sugar is left in the blood, causing blood-sugar levels to steadily rise. Over time, this damages tissues through the chemical reaction known as **glycation**, which occurs when sugar reacts chemically with vital molecules, including proteins, causing them to become stuck together and preventing them from functioning properly.⁷⁸

Glycation also creates harmful **advanced glycation end products** (AGEs), which are known to be a root cause of aging.¹²

The good news is that if it is caught early enough, insulin resistance can be alleviated. Studies have shown you can reduce the risk of progression from prediabetes to diabetes by about **58%** within three years simply through lifestyle interventions.² And of course, people who already have diabetes need to control their blood-sugar levels just as urgently as those with prediabetes.

That's why virtually everyone—diabetic or not—can benefit from recent discoveries about multitargeted nutrients capable of improving insulin sensitivity and reducing fasting blood glucose through a variety of mechanisms of action.



Seaweed Regulates Blood Sugar

Seaweed is a sea vegetable that works in many ways to lower blood sugar and help protect against metabolic syndrome.⁵²⁻⁵⁵

Like cinnamon and chromium, seaweed increases levels of the glucose-transporting **GLUT4**, and increases activity of the energy-sensing PPAR system—both of which promote insulin sensitivity and glucose uptake.^{56,57}

In addition, sea vegetables are rich in **iodine**, which plays a role in maintaining insulin sensitivity.⁵⁸ Animal studies have shown that oral supplementation with iodine *reduces* glucose levels.^{59,60} And one recent human study showed that in obese, iodine-deficient women, iodine supplements reduced high cholesterol.⁶¹

Many of seaweed's sugar-lowering effects occur directly in the digestive tract. There, seaweed components **block** the enzymes needed to release sugar molecules from starch.⁶²⁻⁶⁶ As a result, glucose is not released, never contributing to rising blood sugar levels.⁵²

Another important way seaweed extracts help combat insulin resistance and metabolic syndrome is by reducing body weight and fat mass. When obese animals were given seaweed supplementation, it was found to lower blood sugar, diminish food intake,

reduce body weight, and slow weight gain.⁶⁷ One reason for these benefits could be because seaweed contains compounds that have been shown to *activate* systems that cause fat to be burned off rather than stored in the body.^{68,69}

Seaweed supplementation also reduces the development and maturation of **new fat cells**, which helps prevent weight gain caused by a high fat diet.^{70,71} As a result, supplemented animals were exposed to far lower levels of the inflammation-promoting molecules (cytokines) that fat tissue pours out into the circulation.⁷²

Summary

More than one-third of Americans have metabolic syndrome, an insulin-resistant state in which borderline high blood sugar and other metabolic abnormalities signal ever-growing risks for heart disease, stroke, cancer, and a host of other age-accelerating conditions.⁷³

Sugar-lowering drugs are not generally prescribed until *after* a person develops diabetes, which leaves millions of us in a dangerous, prediabetic state without treatment. Natural supplements have long been shown to reduce the risks of metabolic syndrome by lowering blood-sugar levels *before* they reach dangerous concentrations.

Cinnamon, chromium, amla, shilajit, and seaweed provide sugar-lowering, energy-burning, and fat-reducing properties, and should be considered as a regular part of a healthy supplement regimen.

While diabetics are well aware of the risks of elevated blood sugar, ultimately anyone—even those with normal blood sugar levels—should be keenly interested in maintaining healthy blood-sugar levels. ●

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

References

1. Moore JX, Chaudhary N, Akinyemiju T. Metabolic Syndrome Prevalence by Race/Ethnicity and Sex in the United States, National Health and Nutrition Examination Survey, 1988-2012. *Preventing Chronic Disease*. 2017;14:E24.
2. Mayans L. Metabolic Syndrome: Insulin Resistance and Prediabetes. *FP Essent*. 2015;435:11-6.
3. Lam DW, LeRoith D. Metabolic Syndrome. In: De Groot LJ, Chrousos G, Dungan K, et al., eds. *Endotext*. South Dartmouth (MA): MDText.com, Inc.; 2000.
4. Khan T, Tsipis S, Wozniak G. Medical Care Expenditures for Individuals with Prediabetes: The Potential Cost Savings in Reducing the Risk of Developing Diabetes. *Popul Health Manag*. 2017.
5. Lu Z, Jia Q, Wang R, et al. Hypoglycemic activities of A- and B-type procyanidin oligomer-rich extracts from different Cinnamon barks. *Phytomedicine*. 2010.



6. Qin B, Panickar KS, Anderson RA. Cinnamon: potential role in the prevention of insulin resistance, metabolic syndrome, and type 2 diabetes. *J Diabetes Sci Technol*. 2010;4(3):685-93.
7. Available at: <https://www.ars.usda.gov/news-events/news/research-news/2000/cinnamon-extract-spices-up-sugar-metabolism/>. Accessed April 28, 2017.
8. Anderson RA, Broadhurst CL, Polansky MM, et al. Isolation and Characterization of Polyphenol Type-A Polymers from Cinnamon with Insulin-like Biological Activity. *Journal of Agricultural and Food Chemistry*. 2004;52(1):65-70.
9. Kim W, Khil LY, Clark R, et al. Naphthalenemethyl ester derivative of dihydroxyhydrocinnamic acid, a component of cinnamon, increases glucose disposal by enhancing translocation of glucose transporter 4. *Diabetologia*. 2006;49(10):2437-48.
10. Cao H, Polansky MM, Anderson RA. Cinnamon extract and polyphenols affect the expression of tristetraprolin, insulin receptor, and glucose transporter 4 in mouse 3T3-L1 adipocytes. *Arch Biochem Biophys*. 2007;459(2):214-22.
11. Anand P, Murali KY, Tandon V, et al. Insulinotropic effect of cinnamaldehyde on transcriptional regulation of pyruvate kinase, phosphoenolpyruvate carboxykinase, and GLUT4 translocation in experimental diabetic rats. *Chem Biol Interact*. 2010;186(1):72-81.
12. Singh VP, Bali A, Singh N, et al. Advanced glycation end products and diabetic complications. *Korean J Physiol Pharmacol*. 2014;18(1):1-14.
13. Sheng X, Zhang Y, Gong Z, et al. Improved Insulin Resistance and Lipid Metabolism by Cinnamon Extract through Activation of Peroxisome Proliferator-Activated Receptors. *PPAR Res*. 2008;2008:581348.
14. Couturier K, Batandier C, Awada M, et al. Cinnamon improves insulin sensitivity and alters the body composition in an animal model of the metabolic syndrome. *Arch Biochem Biophys*. 2010;501(1):158-61.
15. Kim SH, Choung SY. Antihyperglycemic and antihyperlipidemic action of Cinnamomi Cassiae (Cinnamon bark) extract in C57BL/Ks db/db mice. *Arch Pharm Res*. 2010;33(2):325-33.
16. Solomon TP, Blannin AK. Changes in glucose tolerance and insulin sensitivity following 2 weeks of daily cinnamon ingestion in healthy humans. *Eur J Appl Physiol*. 2009;105(6):969-76.
17. Hlebowicz J, Hlebowicz A, Lindstedt S, et al. Effects of 1 and 3 g cinnamon on gastric emptying, satiety, and postprandial blood glucose, insulin, glucose-dependent insulinotropic polypeptide, glucagon-like peptide 1, and ghrelin concentrations in healthy subjects. *Am J Clin Nutr*. 2009;89(3):815-21.
18. Lu T, Sheng H, Wu J, et al. Cinnamon extract improves fasting blood glucose and glycosylated hemoglobin level in Chinese patients with type 2 diabetes. *Nutr Res*. 2012;32(6):408-12.
19. Magistrelli A, Chezem JC. Effect of ground cinnamon on postprandial blood glucose concentration in normal-weight and obese adults. *J Acad Nutr Diet*. 2012;112(11):1806-9.
20. Bernardo MA, Silva ML, Santos E, et al. Effect of Cinnamon Tea on Postprandial Glucose Concentration. *J Diabetes Res*. 2015;2015:913651.
21. Mettler S, Schwarz I, Colombani PC. Additive postprandial blood glucose-attenuating and satiety-enhancing effect of cinnamon and acetic acid. *Nutr Res*. 2009;29(10):723-7.
22. Crawford P. Effectiveness of cinnamon for lowering hemoglobin A1C in patients with type 2 diabetes: a randomized, controlled trial. *J Am Board Fam Med*. 2009;22(5):507-12.
23. Akilen R, Tsiami A, Devendra D, et al. Glycated haemoglobin and blood pressure-lowering effect of cinnamon in multi-ethnic Type 2 diabetic patients in the UK: a randomized, placebo-controlled, double-blind clinical trial. *Diabet Med*. 2010;27(10):1159-67.
24. Ziegenfuss TN, Hofheins JE, Mendel RW, et al. Effects of a water-soluble cinnamon extract on body composition and features of the metabolic syndrome in pre-diabetic men and women. *J Int Soc Sports Nutr*. 2006;3:45-53.
25. Kim CH, Younossi ZM. Nonalcoholic fatty liver disease: a manifestation of the metabolic syndrome. *Cleve Clin J Med*. 2008;75(10):721-8.
26. Askari F, Rashidkhani B, Hekmatdoost A. Cinnamon may have therapeutic benefits on lipid profile, liver enzymes, insulin resistance, and high-sensitivity C-reactive protein in nonalcoholic fatty liver disease patients. *Nutr Res*. 2014;34(2):143-8.
27. Ding W, Chai Z, Duan P, et al. Serum and urine chromium concentrations in elderly diabetics. *Biol Trace Elem Res*. 1998;63(3):231-7.
28. Ekmekcioglu C, Prohaska C, Pomazal K, et al. Concentrations of seven trace elements in different hematological matrices in patients with type 2 diabetes as compared to healthy controls. *Biol Trace Elem Res*. 2001;79(3):205-19.
29. Morris BW, MacNeil S, Hardisty CA, et al. Chromium homeostasis in patients with type II (NIDDM) diabetes. *J Trace Elem Med Biol*. 1999;13(1-2):57-61.
30. Pineau A, Guillard O, Risse JF. A study of chromium in human cataractous lenses and whole blood of diabetics, senile, and normal population. *Biol Trace Elem Res*. 1992;32:133-8.
31. Jain SK, Patel P, Rogier K. Trivalent chromium inhibits protein glycosylation and lipid peroxidation in high glucose-treated erythrocytes. *Antioxid Redox Signal*. 2006;8(1-2):238-41.
32. Terpilowska S, Zaporowska H. [The role of chromium in cell biology and medicine]. *Przegl Lek*. 2004;61 Suppl 3:51-4.
33. Vincent JB. Mechanisms of chromium action: low-molecular-weight chromium-binding substance. *J Am Coll Nutr*. 1999;18(1):6-12.
34. Pei D, Hsieh CH, Hung YJ, et al. The influence of chromium chloride-containing milk to glycemic control of patients with type 2 diabetes mellitus: a randomized, double-blind, placebo-controlled trial. *Metabolism*. 2006;55(7):923-7.
35. Keszthelyi Z, Past T, Koltai K, et al. [Chromium (III)-ion enhances the utilization of glucose in type-2 diabetes mellitus]. *Orv Hetil*. 2003;144(42):2073-6.
36. Ryan GJ, Wanko NS, Redman AR, et al. Chromium as adjunctive treatment for type 2 diabetes. *Ann Pharmacother*. 2003;37(6):876-85.
37. Cefalu WT, Rood J, Pinsonat P, et al. Characterization of the metabolic and physiologic response to chromium supplementation in subjects with type 2 diabetes mellitus. *Metabolism*. 2010;59(5):755-62.
38. Wang YQ, Yao MH. Effects of chromium picolinate on glucose uptake in insulin-resistant 3T3-L1 adipocytes involve activation of p38 MAPK. *J Nutr Biochem*. 2009;20(12):982-91.
39. Chen WY, Chen CJ, Liu CH, et al. Chromium supplementation enhances insulin signalling in skeletal muscle of obese KK/HIJ diabetic mice. *Diabetes Obes Metab*. 2009;11(4):293-303.
40. Chen G, Liu P, Pattar GR, et al. Chromium activates glucose transporter 4 trafficking and enhances insulin-stimulated glucose transport in 3T3-L1 adipocytes via a cholesterol-dependent mechanism. *Mol Endocrinol*. 2006;20(4):857-70.
41. Wu YT, Sun Z, Che SP, et al. [Regulation of chromium on gene expression of skeletal muscles in diabetic rats]. *Wei Sheng Yan Jiu*. 2005;34(2):184-7.
42. Qiao W, Peng Z, Wang Z, et al. Chromium improves glucose uptake and metabolism through upregulating the mRNA levels of IR, GLUT4, GS, and UCP3 in skeletal muscle cells. *Biol Trace Elem Res*. 2009;131(2):133-42.
43. Nampoothiri SV, Prathapan A, Cherian OL, et al. In vitro antioxidant and inhibitory potential of Terminalia bellerica and Emblica officinalis fruits against LDL oxidation and key enzymes linked to type 2 diabetes. *Food Chem Toxicol*. 2010.
44. Rao TP, Sakaguchi N, Juneja LR, et al. Amla (Emblica officinalis Gaertn.) extracts reduce oxidative stress in streptozotocin-induced diabetic rats. *J Med Food*. 2005;8(3):362-8.
45. Agarwal SP, Khanna R, Karmarkar R, et al. Shilajit: a review. *Phytother Res*. 2007;21(5):401-5.
46. Surapaneni DK, Adapa SR, Preeti K, et al. Shilajit attenuates behavioral symptoms of chronic fatigue syndrome by modulating the hypothalamic-pituitary-adrenal axis and mitochondrial bioenergetics in rats. *J Ethnopharmacol*. 2012;143(1):91-9.
47. Visser SA. Effect of humic substances on mitochondrial respiration and oxidative phosphorylation. *Sci Total Environ*. 1987;62:347-54.

48. Azzam EI, Jay-Gerin JP, Pain D. Ionizing radiation-induced metabolic oxidative stress and prolonged cell injury. *Cancer Lett.* 2012;327(1-2):48-60.
49. Piotrowska D, Dlugosz A, Witkiewicz K, et al. The research on antioxidant properties of TOLPA Peat Preparation and its fractions. *Acta Pol Pharm.* 2000;57 Suppl:127-9.
50. Babu PS, Stanely Mainzen Prince P. Antihyperglycaemic and antioxidant effect of hyponidd, an ayurvedic herbomineral formulation in streptozotocin-induced diabetic rats. *J Pharm Pharmacol.* 2004;56(11):1435-42.
51. Manjunatha S, Jaryal AK, Bijlani RL, et al. Effect of Chyawanprash and vitamin C on glucose tolerance and lipoprotein profile. *Indian J Physiol Pharmacol.* 2001;45(1):71-9.
52. Heo SJ, Hwang JY, Choi JJ, et al. Diphlorethohydroxycarmalol isolated from *Ishige okamurae*, a brown algae, a potent alpha-glucosidase and alpha-amylase inhibitor, alleviates postprandial hyperglycemia in diabetic mice. *Eur J Pharmacol.* 2009;615(1-3):252-6.
53. Lamela M, Anca J, Villar R, et al. Hypoglycemic activity of several seaweed extracts. *J Ethnopharmacol.* 1989;27(1-2):35-43.
54. Iwai K. Antidiabetic and antioxidant effects of polyphenols in brown alga *Ecklonia stolonifera* in genetically diabetic KK-A(y) mice. *Plant Foods Hum Nutr.* 2008;63(4):163-9.
55. Ruperez P, Ahrazem O, Leal JA. Potential antioxidant capacity of sulfated polysaccharides from the edible marine brown seaweed *Fucus vesiculosus*. *J Agric Food Chem.* 2002;50(4):840-5.
56. Kim SN, Choi HY, Lee W, et al. Sargaquinoic acid and sargahydroquinoic acid from *Sargassum yezoense* stimulate adipocyte differentiation through PPARalpha/gamma activation in 3T3-L1 cells. *FEBS Lett.* 2008;582(23-24):3465-72.
57. Kang SI, Jin YJ, Ko HC, et al. Petalonia improves glucose homeostasis in streptozotocin-induced diabetic mice. *Biochem Biophys Res Commun.* 2008;373(2):265-9.
58. Küpper FC, Schweigert N, Gall EA, et al. Iodine uptake in Laminariales involves extracellular, haloperoxidase-mediated oxidation of iodide. *Planta.* 1998;207(2):163-71.
59. Rajendran D, Pattanaik AK, Khan SA, et al. Iodine Supplementation of *Leucaena leucocephala* Diet for Goats. II. Effects on Blood Metabolites and Thyroid Hormones. *Asian-Australas J Anim Sci.* 2001;14(6):791-6.
60. Nudda A, Battacone G, Bomboi G, et al. Effect of dietary iodine on thyroid hormones and energy blood metabolites in lactating goats. *Animal.* 2013;7(1):60-5.
61. Herter-Aeberli I, Cherkaoui M, El Ansari N, et al. Iodine Supplementation Decreases Hypercholesterolemia in Iodine-Deficient, Overweight Women: A Randomized Controlled Trial. *J Nutr.* 2015;145(9):2067-75.
62. Kim KY, Nguyen TH, Kurihara H, et al. Alpha-glucosidase inhibitory activity of bromophenol purified from the red alga *Polyopes laticifolia*. *J Food Sci.* 2010;75(5):H145-50.
63. Apostolidis E, Lee CM. In vitro potential of *Ascophyllum nodosum* phenolic antioxidant-mediated alpha-glucosidase and alpha-amylase inhibition. *J Food Sci.* 2010;75(3):H97-102.
64. Kim KY, Nam KA, Kurihara H, et al. Potent alpha-glucosidase inhibitors purified from the red alga *Grateloupia elliptica*. *Phytochemistry.* 2008;69(16):2820-5.
65. Zhang J, Tiller C, Shen J, et al. Antidiabetic properties of polysaccharide- and polyphenolic-enriched fractions from the brown seaweed *Ascophyllum nodosum*. *Can J Physiol Pharmacol.* 2007;85(11):1116-23.
66. Shan X, Liu X, Hao J, et al. In vitro and in vivo hypoglycemic effects of brown algal fucoidans. *Int J Biol Macromol.* 2016;82:249-55.
67. Shimada R, Fujita M, Yuasa M, et al. Oral administration of green algae, *Euglena gracilis*, inhibits hyperglycemia in OLETF rats, a model of spontaneous type 2 diabetes. *Food Funct.* 2016;7(11):4655-9.
68. Maeda H. Nutraceutical effects of fucoxanthin for obesity and diabetes therapy: a review. *J Oleo Sci.* 2015;64(2):125-32.
69. Lee SH, Ko SC, Kang MC, et al. Octaphlorethol A, a marine algae product, exhibits antidiabetic effects in type 2 diabetic mice by activating AMP-activated protein kinase and upregulating the expression of glucose transporter 4. *Food Chem Toxicol.* 2016;91:58-64.
70. Kang MC, Kang N, Kim SY, et al. Popular edible seaweed, *Gelidium amansii* prevents against diet-induced obesity. *Food Chem Toxicol.* 2016;90:181-7.
71. Kang MC, Kang N, Ko SC, et al. Anti-obesity effects of seaweeds of Jeju Island on the differentiation of 3T3-L1 preadipocytes and obese mice fed a high-fat diet. *Food Chem Toxicol.* 2016;90:36-44.
72. Oh JH, Kim J, Lee Y. Anti-inflammatory and anti-diabetic effects of brown seaweeds in high-fat diet-induced obese mice. *Nutr Res Pract.* 2016;10(1):42-8.
73. Aguilar M, Bhuket T, Torres S, et al. Prevalence of the metabolic syndrome in the united states, 2003-2012. *JAMA.* 2015;313(19):1973-4.
74. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/>. Accessed April 28, 2017.
75. Eyster CA, Olson AL. Compartmentalization and regulation of insulin signaling to GLUT4 by the cytoskeleton. *Vitam Horm.* 2009;80:193-215.
76. Lauritzen HP. In vivo imaging of GLUT4 translocation. *Appl Physiol Nutr Metab.* 2009;34(3):420-3.
77. Leney SE, Tavaré JM. The molecular basis of insulin-stimulated glucose uptake: signalling, trafficking and potential drug targets. *J Endocrinol.* 2009;203(1):1-18.
78. Gkogkolou P, Böhm M. Advanced glycation end products: Key players in skin aging? *Dermato-endocrinology.* 2012;4(3):259-70.



AMPK

PROMOTES LONGEVITY FACTORS

Importance of AMPK

Studies show **increased** AMPK activity supports:

- Reduced fat storage,¹
- New mitochondria production,²
- The promotion of healthy blood glucose and lipids already within normal range.³

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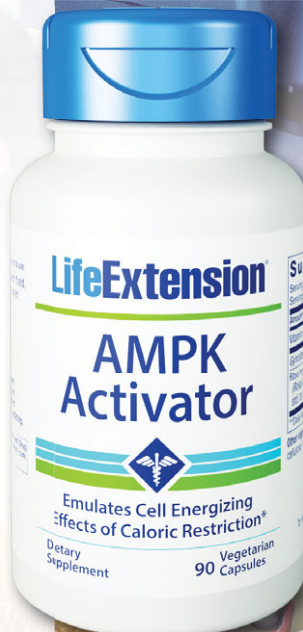
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References

1. *Age (Dordr)*. 2014 Apr;36(2):641-63.
2. *Clin Sci (Lond)*. 2013 Apr;124(8):491-507.
3. *J Mol Med (Berl)*. 2011 Jul;89(7):667-76.
4. *Biotechnol Lett*. 2012 Sep;34(9):1607-16.
5. *Obesity (Silver Spring)*. 2014 Jan;22(1):63-71.

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BY SCOTT FRANKLIN

MELATONIN'S

Newly Discovered Anti-Aging Mechanism

Loss of mitochondrial function contributes to aging throughout the body. **Mitochondrial** decline opens the door to age-related diseases such as neurodegeneration, diabetes, and obesity.¹⁻¹²

In a discovery published in **2017**, scientists found that the natural hormone **melatonin** works in a *unique* way to combat **mitochondrial dysfunction**.¹³

A contributor to mitochondrial dysfunction is the opening of a hole in the mitochondrial inner membrane that decreases their ability to produce energy. Preventing or closing this **hole** is a key to preserving youthful mitochondrial function. Up until recently, there were no drugs able to do so permanently.

This landmark **2017** study reveals that **melatonin** helps maintain normal levels of an *enzyme* whose job is to **plug** that hole.¹³

By preserving mitochondrial function, **melatonin** exerts a *highly targeted* and specific action on a fundamental cause of aging.



Mitochondria and Aging

Melatonin has long been hailed for its benefits on cellular function and disease prevention, as well as its impressive impact on longevity in animal models of aging.¹⁴⁻²¹

In a study published in **2017**, scientists uncovered a new way that melatonin promotes longevity. This new mechanism involves melatonin's ability to preserve mitochondrial function.

To fully grasp the impact of the study's findings, we first need to review some background information.

Mitochondrial dysfunction plays a large role in aging and disease because mitochondria are the powerhouses of our cells. By "burning" fuel supplied by the food we eat, mitochondria release massive amounts of **energy** needed to power the human body.

This **energy release** occurs in the form of molecules of **ATP** (adenosine triphosphate). ATP drives every cellular function that requires energy. Low levels of ATP result in diminished energy,

decreased cellular function, and, eventually, poor tissue, organ, and system function throughout the body.

The number of mitochondria in our cells, and their efficient function, degrades over time. This accounts for a large part of the aging we experience in the form of increased disease vulnerability and shortened lifespans.¹⁻³

Mitochondrial Death Channel

A contributor to mitochondrial dysfunction is the activation of a protein in the mitochondrial inner membrane called **MPTP**, or *mitochondrial permeability transition pore*.²²⁻²⁴ The MPTP forms a channel, or pore, through the mitochondrial membrane.^{25,26}

MPTP opening is not good because it causes swelling, as water and small chemical molecules flow nonstop into the mitochondria.¹³ This is followed by a sudden sharp loss of the mitochondria's ability to retain their essential electric

charge. The result is a collapse of energy production, a decrease in ATP supplies, and increased oxidative stress on cells.²⁴

Numerous studies show that opening of the MPTP is associated with common diseases of aging, and with markers of aging itself in human tissues.²⁵⁻³¹ Closing the MPTP is essential for long-lived, efficient mitochondria.^{13,24,28}

The new study shows us for the first time that **melatonin supplementation** can dramatically reduce the **MPTP** opening, thereby reducing the impact of dead and dying mitochondria on aging without resorting to toxic and expensive drugs.

New Findings

In the study published in early **2017**, researchers in South Carolina and Russia teamed up to investigate details of how melatonin interacts with the MPTP to boost and preserve mitochondrial function.¹³ In an entirely new development, the researchers found that melatonin improved mitochondrial function by *boosting* levels of an *enzyme* involved in controlling MPTP holes.¹³

The enzyme, called **CNPase**, protects mitochondria. It does this by breaking down a molecule that promotes the opening of the MPTP. Continued **CNPase** activity is necessary for maintaining normal mitochondrial function and energy availability in the cell.¹³

But animal research has shown that CNPase levels fall by as much as **34%** with aging, accompanied with loss of mitochondrial electrical function by up to **69%**.²⁴ This has dangerous effects on overall tissue and organ function.

The new study found that melatonin helps maintain normal levels

of CNPase within mitochondria, where it suppresses MPTP. This *maintains* normal electrical function in mitochondria and contributes to normal tissue and organ function, resistance to disease, and slower aging.¹³

These findings indicate that, at the most basic possible level, melatonin contributes to disease resistance and age deceleration through its direct impact on mitochondrial function.

Melatonin as Mitochondrial Medicine

The findings of this new study lend additional weight to the evidence that **melatonin** prevents age-associated disease through its impact on **mitochondrial health**.¹⁹

This should not be surprising, considering the highest concentrations of melatonin inside of cells is found in the mitochondria, which suggests an important natural role for its effects on energy production and cellular integrity.³²

Indeed, melatonin is known for its ability to extend the lifespan of multiple species, from insects to

mammals. This effect is accomplished through melatonin's ability to protect mitochondria, promote longevity-associated proteins such as **SIRT1**, and reduce oxidative stress that can induce mitochondrial destruction.¹⁴⁻²¹

Specifically, melatonin can:

- Prevent age-related mitochondrial dysfunction in brain cells, with the potential to slow or prevent neurodegenerative diseases,^{4,8-10}
- Prevent death of skeletal muscle cells through supporting mitochondrial energy production,⁵
- Protect heart muscle cells following loss of blood flow (ischemia) during and after a heart attack,⁶
- Improve mitochondrial function, and hence, energy utilization, in fat tissues of animal models of diabetes and obesity,¹¹
- Alleviate fatty liver disease by protecting liver mitochondria in similar animal models,¹²

- Improve function of smooth muscle cells in intestines, which often slows down during aging as their energy supplies are threatened.²

With its newly-discovered ability to support the CNPase enzyme, and the resulting prevention of MPTP formation, melatonin helps preserve youthful function in every tissue in the body.

And since most human cells and tissues contain mitochondria, that translates to a vital protective effect of melatonin in all body organs and systems.

Summary

Loss of **mitochondrial function** is a fundamental contributor to **aging** in every cell, tissue, organ, and body system in humans.

A landmark study published in early **2017** has shown that melatonin supplementation supports youthful mitochondrial function by preventing the expression of an opening, or pore, or "hole" in mitochondrial membranes that would otherwise degrade their ability to generate energy.

Melatonin and Aging

Loss of mitochondrial function is a known fundamental contributor to aging throughout the body, predisposing us to age-related diseases such as coronary artery disease, neurodegeneration, and metabolic disturbances like diabetes and obesity.

A major contributor to mitochondrial dysfunction is the opening of a hole in mitochondrial membranes that results in swelling and eventual death of individual mitochondria.

Studies reveal that melatonin preserves healthy mitochondrial function by safely and effectively preventing the opening of the pore.

Life Extension® recommends regular melatonin supplementation to prevent mitochondrial degradation, and to preserve youthful energy supplies.

Melatonin is a low-cost supplement that has been available to Americans since **1992**.



This results in enhanced mitochondrial function, and a reduction in age-related diseases—and it goes a long way to explaining melatonin's known longevity-promoting properties.

By supplementing with **melatonin**, we can preserve youthful energy supplies by providing protection for the body's main energy source. ●

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

References

- Ganie SA, Dar TA, Bhat AH, et al. Melatonin: A Potential Anti-Oxidant Therapeutic Agent for Mitochondrial Dysfunctions and Related Disorders. *Rejuvenation Res.* 2016;19(1):21-40.
- Martin-Cano FE, Camello-Almaraz C, Acuna-Castroviejo D, et al. Age-related changes in mitochondrial function of mouse colonic smooth muscle: beneficial effects of melatonin. *J Pineal Res.* 2014;56(2):163-74.
- Paradies G, Paradies V, Ruggiero FM, et al. Protective role of melatonin in mitochondrial dysfunction and related disorders. *Arch Toxicol.* 2015;89(6):923-39.
- Petrosillo G, Fattoretti P, Matera M, et al. Melatonin prevents age-related mitochondrial dysfunction in rat brain via cardiolipin protection. *Rejuvenation Res.* 2008;11(5):935-43.
- Hibaoui Y, Roulet E, Ruegg UT. Melatonin prevents oxidative stress-mediated mitochondrial permeability transition and death in skeletal muscle cells. *J Pineal Res.* 2009;47(3):238-52.
- Petrosillo G, Colantuono G, Moro N, et al. Melatonin protects against heart ischemia-reperfusion injury by inhibiting mitochondrial permeability transition pore opening. *Am J Physiol Heart Circ Physiol.* 2009;297(4):H1487-93.
- Petrosillo G, Moro N, Ruggiero FM, et al. Melatonin inhibits cardiolipin peroxidation in mitochondria and prevents the mitochondrial permeability transition and cytochrome c release. *Free Radic Biol Med.* 2009;47(7):969-74.
- Jou MJ. Melatonin preserves the transient mitochondrial permeability transition for protection during mitochondrial Ca(2+) stress in astrocyte. *J Pineal Res.* 2011;50(4):427-35.
- Ozturk G, Akbulut KG, Guney S, et al. Age-related changes in the rat brain mitochondrial antioxidative enzyme ratios: modulation by melatonin. *Exp Gerontol.* 2012;47(9):706-11.
- Cardinali DP, Pagano ES, Scacchi Bernasconi PA, et al. Melatonin and mitochondrial dysfunction in the central nervous system. *Horm Behav.* 2013;63(2):322-30.
- Jimenez-Aranda A, Fernandez-Vazquez G, Mohammad ASM, et al. Melatonin improves mitochondrial function in inguinal white adipose tissue of Zucker diabetic fatty rats. *J Pineal Res.* 2014;57(1):103-9.
- Agil A, El-Hammadi M, Jimenez-Aranda A, et al. Melatonin reduces hepatic mitochondrial dysfunction in diabetic obese rats. *J Pineal Res.* 2015;59(1):70-9.
- Baburina Y, Odinokova I, Azarashvili T, et al. 2',3'-Cyclic nucleotide 3'-phosphodiesterase as a messenger of protection of the mitochondrial function during melatonin treatment in aging. *Biochim Biophys Acta.* 2017;1859(1):94-103.
- Stacchiotti A, Favero G, Lavazza A, et al. Hepatic Macrosteatosis Is Partially Converted to Microsteatosis by Melatonin Supplementation in ob/ob Mice Non-Alcoholic Fatty Liver Disease. *PLoS One.* 2016;11(1):e0148115.
- Jenwitheesuk A, Nopparat C, Mukda S, et al. Melatonin regulates aging and neurodegeneration through energy metabolism, epigenetics, autophagy and circadian rhythm pathways. *Int J Mol Sci.* 2014;15(9):16848-84.
- Teran R, Bonilla E, Medina-Leendertz S, et al. The life span of *Drosophila melanogaster* is affected by melatonin and thioctic acid. *Invest Clin.* 2012;53(3):250-61.
- Chang HM, Wu UI, Lan CT. Melatonin preserves longevity protein (sirtuin 1) expression in the hippocampus of total sleep-deprived rats. *J Pineal Res.* 2009;47(3):211-20.
- Rodriguez MI, Escames G, Lopez LC, et al. Improved mitochondrial function and increased life span after chronic melatonin treatment in senescent prone mice. *Exp Gerontol.* 2008;43(8):749-56.
- Anisimov VN, Popovich IG, Zabezhinski MA, et al. Melatonin as antioxidant, geroprotector and anticarcinogen. *Biochim Biophys Acta.* 2006;1757(5-6):573-89.
- Hevia D, Gonzalez-Menendez P, Quiros-Gonzalez I, et al. Melatonin uptake through glucose transporters: a new target for melatonin inhibition of cancer. *J Pineal Res.* 2015;58(2):234-50.
- Magnanou E, Attia J, Fons R, et al. The timing of the shrew: continuous melatonin treatment maintains youthful rhythmic activity in aging *Crocidura russula*. *PLoS One.* 2009;4(6):e5904.
- Jackson EK, Menshikova EV, Mi Z, et al. Renal 2',3'-Cyclic Nucleotide 3'-Phosphodiesterase Is an Important Determinant of AKI Severity after Ischemia-Reperfusion. *J Am Soc Nephrol.* 2016;27(7):2069-81.
- Baburina Y, Azarashvili T, Grachev D, et al. Mitochondrial 2', 3'-cyclic nucleotide 3'-phosphodiesterase (CNP) interacts with mPTP modulators and functional complexes (I-V) coupled with release of apoptotic factors. *Neurochem Int.* 2015;90:46-55.
- Krestinina O, Azarashvili T, Baburina Y, et al. In aging, the vulnerability of rat brain mitochondria is enhanced due to reduced level of 2',3'-cyclic nucleotide-3'-phosphodiesterase (CNP) and subsequently increased permeability transition in brain mitochondria in old animals. *Neurochem Int.* 2015;80:41-50.
- Ichas F, Mazat JP. From calcium signaling to cell death: two conformations for the mitochondrial permeability transition pore. Switching from low- to high-conductance state. *Biochim Biophys Acta.* 1998;1366(1-2):33-50.
- Lemasters JJ, Nieminen AL, Qian T, et al. The mitochondrial permeability transition in cell death: a common mechanism in necrosis, apoptosis and autophagy. *Biochim Biophys Acta.* 1998;1366(1-2):177-96.
- Baines CP. The cardiac mitochondrion: nexus of stress. *Annu Rev Physiol.* 2010;72:61-80.
- Bopassa JC, Michel P, Gateau-Roesch O, et al. Low-pressure reperfusion alters mitochondrial permeability transition. *Am J Physiol Heart Circ Physiol.* 2005;288(6):H2750-5.
- Fiskum G. Mitochondrial participation in ischemic and traumatic neural cell death. *J Neurotrauma.* 2000;17(10):843-55.
- Honda HM, Ping P. Mitochondrial permeability transition in cardiac cell injury and death. *Cardiovasc Drugs Ther.* 2006;20(6):425-32.
- Schinder AF, Olson EC, Spitzer NC, et al. Mitochondrial dysfunction is a primary event in glutamate neurotoxicity. *J Neurosci.* 1996;16(19):6125-33.
- Paradies G, Petrosillo G, Paradies V, et al. Melatonin, cardiolipin and mitochondrial bioenergetics in health and disease. *J Pineal Res.* 2010;48(4):97-310.

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Reference

1. *Int Angiol.* 2014 Feb;33(1):20-6.

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References

1. *Skin Pharmacol Physiol.* 2014;27(3):113-9.
2. *Vet Rec.* 1984 Dec 22-29;114(25-26):642-5.
3. *Nutr Today.* 1993;28(4):13-8.

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BY GARRY MESSICK

The Neurogenesis Diet & Lifestyle Interview with author **Brant Cortright, PhD**

Contrary to previous scientific belief, human adult brain cells can regenerate. This discovery prompted Brant Cortright, PhD, professor of psychology at San Francisco's California Institute of Integral Studies, to look at the research and write a book about this exciting new field of **neurogenesis**.

The Neurogenesis Diet & Lifestyle combines a holistic approach to increase the creation of new brain cells with the latest neuroscience research on enhancing brain health and cognitive function.

In his book, Cortright points to research showing that neurogenesis is "*the most important biomarker for brain health most people never heard of.*" While a low rate of neurogenesis is linked with mental disorders such as anxiety, depression, stress, and cognitive deficits, a high rate of neurogenesis has only positive effects—lowered stress, anxiety and depression, plus enhanced cognitive abilities including faster learning and better problem-solving skills.

Dr. Cortright sat down with us to discuss **neurogenesis** as well as some of the methods that can be used to enhance this extremely beneficial process.

LE: Medical science once believed that people stop growing new brain cells early in life, but recent research has shown that to be false. What are the implications of this?

BC: The discovery that your brain produces new brain cells as long as you are alive upends the belief that the brain stops growing in young adulthood. It also changes our entire picture of aging, for if new brain cells are being formed, then the brain can renew itself. What is key is the rate at which new brain cells form.

There are vast differences in how quickly people produce new brain cells, and your rate of neurogenesis may be the single most important factor for a high quality of life. When neurogenesis is high, you are alive, engaged, expansive, fulfilling your potential. Your mind's abilities are enhanced and your emotional vitality is strong. You are protected from stress and depression. You feel good and life is fulfilling. Immunity is robust. Your spirits are high and your outlook is positive.

LE: What happens with a low rate of neurogenesis?

BC: Your brain shrinks, your life contracts, and you move toward memory loss, cognitive deficits, dementia, stress and anxiety, depression, reduced executive function and immunity, and myriad health problems. When neurogenesis is low, your whole quality of life suffers. Having a high level of neurogenesis may be the most important thing you can do to cultivate a high quality of life.

LE: In your book, you advocate a holistic approach to neurogenesis involving diet and stimulation of what you call the four levels of the brain: body, heart, mind, and spirit. What's the rationale behind this approach?

BC: Different kinds of brain stimulation support each other. For instance, running boosts neurogenesis, but with running alone there is a **40% to 60%** loss of these newly created brain cells. However, other parts of an enriched environment prevent neuronal cell loss

but don't increase the number of new neurons formed. Put together, there is a large boost in new brain cells as well as an almost **100%** survival rate. But only a holistic, multipronged approach produces the powerful boost in both new neurons and survival rates that results in a major increase in neurogenesis.

LE: You recommend a number of foods and nutrients that are available as extracts.

BC: Yes. This makes including these in your diet more economical and practical. For example, a daily diet that includes fresh blueberries can be pricey, but two capsules of blueberry extract is much more affordable and easier to keep in the house.

LE: Which nutrients have been shown to increase neurogenesis?

BC: The four most outstanding foods for stimulating neurogenesis are blueberries, omega-3 fatty acids, green tea, and curcumin. It's worth considering making these a part of your regular diet.

LE: Let's take a closer look at some of these nutrients. What can you tell us about blueberries, for instance?

BC: It's hard to sing blueberries' praises highly enough. They act in so many ways to promote neurogenesis and protect the brain from cognitive decline that if blueberries were a drug, pharmaceutical companies would be bombarding us with ads to entice us to upgrade our brains with this "miracle drug."

Numerous studies show adding blueberries to the daily diet of mice increases neurogenesis significantly. Further, blueberries seem to protect against cognitive decline, inflammation, oxidation (free radical damage), radiation,



and glycation. Generally, it takes different substances to protect against any one of these things. That blueberries have so many effects is little short of astounding. Blueberries are packed with polyphenols, especially flavonoids called anthocyanins that stimulate neurogenesis. More specifically, the anthocyanin dye, which causes the dark blue color, crosses the blood-brain-barrier to stimulate neurogenesis.

Blueberries have been shown to reverse cognitive decline in both humans and animals. Mice bred to develop Alzheimer's showed improvements in memory when fed blueberries, and two neuroprotective chemicals were higher in these mice. Humans with cognitive decline showed improvements after consuming blueberries daily. Aside from increasing neurogenesis, blueberries allow better communication among neurons, something called signal transduction, and they also protect against brain injury, stroke, certain neurotoxins, excitotoxicity, and so may help with Parkinson's, MS, and other neurodegenerative diseases as well.

LE: How about omega-3s?

BC: Neuroscience researcher Sandrine Thuret, PhD, of London's Kings College, reported a **40%** increase in neurogenesis by adding omega-3s in *Science Daily* in 2007. Other studies have shown equally impressive gains in neurogenesis.

Our brains are made up of about **60%** fat. DHA, one of the most important of the omega-3s, constitutes about **30%** of the brain's cerebral cortex. In the ongoing tearing down, replacing, and rebuilding of our brains' cellular structures, we want to consume high-quality fats in



order to continuously rebuild our brains with the best fats possible. Omega-3s are the highest quality fats for brain development. A diet high in unhealthy or "bad" fats slows down neurogenesis, but a diet high in healthy or "good" omega-3s increases neurogenesis to a higher level.

LE: Green tea contains polyphenols, including epigallocatechin gallate (EGCG). Does this have an effect on neurogenesis?

BC: Yes. Green tea's polyphenols have been shown to increase BDNF (brain-derived neurotrophic factor, which appears to be the main signal that turns on neurogenesis), and to have strong health benefits ranging from cancer prevention, cardiovascular benefits, immunity improvement, and glucose reduction. EGCG and green tea's other polyphenols not only increase

neurogenesis but, like blueberries and omega-3s, exert powerful antioxidant and anti-inflammatory effects as well. Green tea has clear cognitive benefits and even improves working memory, which is one of the most difficult functions to increase.

LE: How about the benefits of curcumin?

BC: Curcumin has strong neurogenic effects. In addition, it is a powerful anti-inflammatory and antioxidant compound. Aging populations who consume curcumin show better cognitive performance. It reduces beta-amyloid and plaque formation in aging humans and has high potential as part of an anti-Alzheimer's strategy. It has long shown antidepressant effects, which naturally follow from decreasing inflammation and increasing neurogenesis.



LE: As just one other example, you also write about melatonin's healthful properties.

BC: Melatonin is a hormone secreted by the pineal gland. The body secretes melatonin at night, when it's dark and we're asleep. Levels drop as we age, as does neurogenesis, and, accordingly, sleep disturbances increase. Melatonin increases neurogenesis and helps regulate it. It also increases the immune system's capacity and has anticancer effects. Melatonin can be used as a sleep aid at night. There is wide dosage individual variation—some people take **1 mg** per night while others take **20** to

30 mg per night. This is a vivid example of how you need to individualize your own approach to brain health.

LE: Finally, could you briefly outline how exercise of the mind relates to neurogenesis?

BC: Exercising the mind by engaging in various forms of mental stimulation increases neurogenesis and keeps mental faculties sharp. There is no quick fix for keeping our mental abilities strong, no one exercise or video game that will prevent the mind from deteriorating. Most forms of mental stimulation are discrete and do not generalize to other

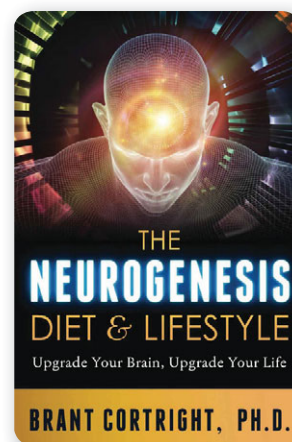
parts of cognitive function. Hence, we need to use our minds in as many ways as we can—reading, problem solving, remembering, discussing, writing, musical training, and attention training.

Building cognitive reserve by using our minds throughout our lives is an insurance policy against Alzheimer's and dementia. At whatever age we begin, mental exercise increases neurogenesis and expands our world. ●

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

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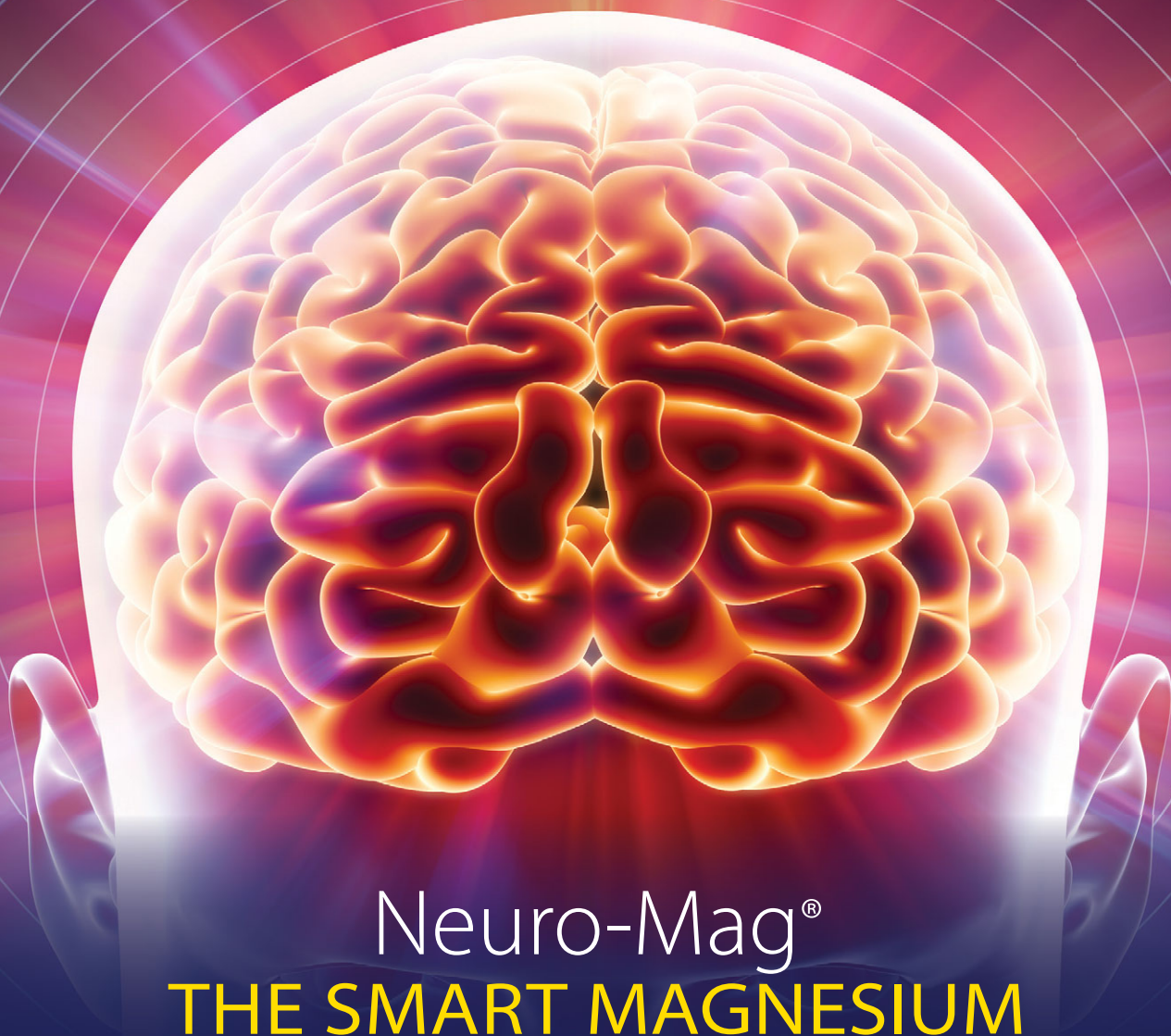
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* *Alzheimers Dis.* 2015;49(4):971-90.

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BY GARRY MESSICK

Mushrooms

Some of the healthiest “vegetables” you can eat aren’t really vegetables. Take the savory mushroom. It’s actually a fungus, which doesn’t sound appetizing, but nevertheless, mushrooms are one of the most popular “veggies” around.

Luckily, they’re also quite nutritious—low in fat and sodium, cholesterol free, but high in dietary fibers, minerals and B vitamins, among many other important nutrients.¹

Just one word of warning: Unless you *really* know what you’re doing, it’s best to avoid picking your own wild mushrooms. Some types are toxic and can make you seriously ill, or worse.

Here’s a list of some of the specific health benefits of mushrooms...

Boost Your Immune System

Unlike the majority of fruits and vegetables, mushrooms contain selenium,¹ which improves the activity of T cells, which in turn contribute to the body’s immune defenses.² They also harbor beta-glucans in their cell walls, which help prevent tumors from developing by boosting the immune system.³

Lower Blood Pressure

Mushrooms contain a good amount of potassium.¹ Potassium helps control blood pressure by maintaining normal fluid and mineral balance.⁴

Improved Nutrient Absorption

Mushrooms are a good source of vitamin D,¹ which doesn’t turn up much in other foods. Vitamin D helps the body absorb and metabolize minerals such as phosphorous and calcium,⁵ which mushrooms also contain.

Lowered Risk of Diabetes

Mushrooms contain dietary fibers,¹ and high-fiber diets help fight diabetes.⁶ According to research, type II diabetics have shown better sugar, lipid, and insulin levels.⁷

References

1. *Int J Microbiol.* 2015;2015:376387.
2. *Endocrine.* 2015;48(3):756-75.
3. Available at: <http://tinyurl.com/hezchqf>. Accessed May 17, 2017.
4. Available at: <http://m.mushroominfo.com/benefits/>. Accessed May 17, 2017.
5. Available at: <https://www.ncbi.nlm.nih.gov/books/NBK109831/>. Accessed May 17, 2017.
6. *Horm Metab Res.* 2007;39(9):687-93.
7. *N Engl J Med.* 2000;342(19):1392-8.

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BY KYLE RODERICK

DR. SARA GOTTFRIED

How to Feel Younger, and Live Stronger and Longer



Sara Gottfried, MD, is a board-certified gynecologist and a graduate of Harvard Medical School and MIT.

Based in Berkeley, Calif., Dr. Gottfried uses evidence-based medical data, functional medicine and natural hormone balancing strategies in her practice to help women lose weight, detoxify, and slow down aging.

The author of the *New York Times* bestsellers *The Hormone Cure* and *The Hormone Reset Diet*, Dr. Gottfried published her latest book, *Younger: A Breakthrough Program to Reset Your Genes, Reverse Aging & Turn Back the Clock 10 Years* in March 2017.

The following is a recent interview with Dr. Gottfried at her medical office.

LE: The relatively affordable price of genetic testing is opening up new opportunities for the way women think about their health and how they care for their bodies. Many are getting their genes mapped. How do women find doctors who can understand this information and work with them to devise strategies that will help them feel optimally healthy and younger?

SG: I agree that finding a collaborative functional medicine doctor—who can perform root-cause analysis and look at the whole picture, from DNA to the entire body—is important, but I also believe we need to start with the basics of what are the most important seven genes to know and what can be changed with health strategies that address them (i.e., epigenetics). My new book, *Younger*, cites these genes and provides a foundation for women to learn evidence-based and specific directions to counter the aging process that begins in the muscles and skin, as well as to reduce stress at a molecular level, sleep better, and feel younger.

Functional medicine is an increasingly popular and holistic system of medicine that engages the whole person, not just an isolated set of symptoms, and works from the inside out to address the root cause of disease and accelerated aging. Most of the root causes for health problems stem from a lack of nutrients, movement, sleep, and mindset. Each of these impacts the body's natural aging process. By looking at both genetics and lifestyle, I gain insights about changes that will reduce or eliminate chronic or recurring symptoms. Only **10%** of a given disease is caused by your genes, while **90%** is caused by environmental factors, including the environment you create with your lifestyle choices. I call this the 90/10 rule: Genetics loads the gun, and the environment pulls the trigger.



LE: What are some common health problems that you see in your practice?

SG: Fast aging is the biggest health problem that I see in my practice and with the people I work with online. It's the elephant in the room that no one is talking about, yet most of it is modifiable with small lifestyle tweaks. For starters, I created the Healthspan Quiz to help determine the rate at which you are aging and set your baseline for calculating improvement. This quiz is online at youngerquiz.com

The Healthspan Score gives you a baseline measurement of the most important factors determining your rate of aging: demographics, lifestyle, stress, exposures, medical and family history, antioxidant status, connectedness, and brain function. These measurements indicate how your genes are performing. Every one of them affects your genetic expression and helps highlight, even prioritize, the functional medicine solution. Each measurement reflects a key aspect of aging, from disease risk to oxidative stress, and therein suggests where you need the most help.

Since mapping the human genome, scientists developed an important complementary concept called the exposome—the sum of all exposures in an individual over a lifetime from diet, lifestyle, and behaviors, how the body responds to them, and, finally, how these exposures relate to health. These factors have the power to work for or against you, and these can also adjust how your genes are expressed in your DNA sequence.

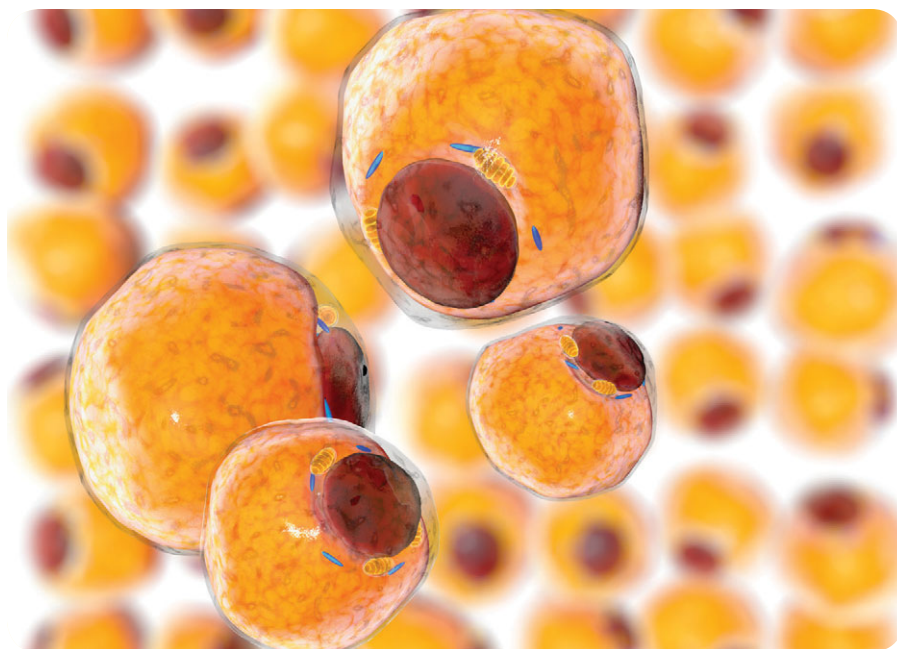
If you decide to pursue genetic testing, the good news is that it is increasingly more affordable. As of March 2017, it costs about \$200 to map important genes. I predict

that in the near future, many of us will carry our own genomes printed out on smart cards kept in our wallets. This will allow for a more personalized approach to preventing disease and unnecessary aging. Until that day arrives, though, you can still improve your health span and reduce the rate of your body's aging, even without genetic testing.

LE: Please provide a few telling examples of gene-related rejuvenating strategies that are in *Younger* and how these can help women.

SG: At age 44, I got a research opportunity few people would want. I performed a simple blood test of how fast I was aging, and I failed. I was aging 20 years faster than my chronological years according to my telomeres, which are the protective caps on chromosomes that deal with aging. Looking in the mirror, I could see the telltale signs: wrinkles, puffy skin, bags under my eyes, a lack of sparkle. My telomeres specifically, and my body generally, needed rescuing, so I rolled up my sleeves, dove into the science, and created a breakthrough protocol to fix them and slow down my aging process.

My book zeroes in on the top seven genes that can be working for or against you as you age, and for example, these include the vitamin D receptor (VDR) gene. When this gene is turned on in your body, it codes for the nuclear hormone receptor for vitamin D3, which enables your cells to absorb vitamin D. When it's turned off, you are more likely to suffer from osteoporosis. If you have a bad variant of VDR, as I do, you need to open the vitamin D receptor by keeping your blood levels higher than recommended by conventional doctors, with a target range of 60 to



90 ng/mL. My vitamin D receptor functions at half the level of a normal VDR, so I keep the amount of vitamin D in my blood at about double the recommended level in order to work around my bad variant. If you have a bad variant of VDR, your task may be to raise your intake of vitamin D beyond the standard recommendation of **1,000 to 2,000 IU** per day.

Another example of a gene that many people in my practice have, and I do, too, is the fat mass and obesity associated (FTO) gene. I call this the **FATSO** gene because this gene is strongly associated with your body mass index and thus your risk for obesity and diabetes. When you have the variant of the FTO gene, your body has limited control over leptin, a hormone in charge of satiety. In other words, you feel hungry all the time. You can turn off the variant of the FTO gene with a regular exercise program and a low-carbohydrate food plan that's high in fiber.

Another of your genes that's vital to understand is the Detox Gene, also known as MTHFR. This

provides instructions for making an enzyme that plays an important role in the processing of folic acid and amino acids, the building blocks of proteins. MTHFR is also important as it also helps you detoxify alcohol and homocysteine.

Science proves that degenerative diseases, like Alzheimer's and cancer, begin in the body decades before symptoms. The good news is that you can now interpret your health through the lens of your genetic history and tendencies, particularly when it comes to aging, so that you can expand both your lifespan and your healthspan. Should you decide against genetic testing, you can consult the seven-week protocol outlined in *Younger* for food, sleep, exercise, stress-busting, and brain-boosting action plans that may help you slow down your aging process.

LE: How and why is the protocol outlined in your book authoritative?

SG: The 7-week protocol I write about in *Younger* was shown to be efficacious in a beta test of 1,000

people (**99%** women). On average, they added 10 years to their healthspan, the period of time where you feel vital and are relatively disease free. I'm happy to report that I've closed the gap: instead of being 20 years older than my chronological years as measured by my telomeres, now I'm only 3 years older biologically, and trust that the gap will continue to improve as I continue to follow the *Younger* protocol further. I'm a physician scientist who understands evidential hierarchy, which means that I only recommend medical strategies that have substantial scientific proof behind them.

LE: How is *Younger* especially relevant and potentially helpful to women in their 40s? Women in their 50s?

SG: The female body is magnificent, but it doesn't come with a lifetime warranty or an owner's manual. While each woman is the result of millions of years of evolution, many of the adaptations that helped her ancestors survive are now making her fat and wrinkly and are no longer needed. A woman's genetic code—the DNA sequence that is the biochemical basis of heredity in all living organisms—is only a small part of the story. As I tell my patients, “Your DNA is a unique, one-of-a-kind blueprint that is specific to you. Even if you haven't been dealt platinum genes, you can still look great and age more slowly.”

Let's consider what's actually happening in your body in your 40s. By the time you reach middle age, there has been an unseen, predetermined, 25-year process of cellular decline. Cellular decline progresses insidiously, unobserved by most people, perhaps including you and your well-intentioned doctor. You may notice it as muscle

tightness, an emerging paunch, lingering hangovers, or difficulty reading labels, or you may recognize it by the fact that staying in shape seems to require ten times the effort. Your endocrine glands, from your ovaries to your thyroid, start to sputter and gasp in their hormone production. Then muscle mass declines and gets replaced by fat, and suddenly you realize—like I did on a recent fitness spree—that the activity of jumping is no longer an option. Nevertheless, thanks to recent scientific breakthroughs, middle age now offers all of us profound opportunities to reprogram our genes and bodies.

We can do this before decay, or what we can refer to as accelerated aging, sets in. One of the most intriguing recent findings regarding life extension comes from the *Centers for Disease Control and Prevention*, which reported in 2015, for the first time in several years, that longevity had declined due to an uptick in heart disease, diabetes, stroke, and Alzheimer's.

If those diagnoses seem abstract and irrelevant to you, consider how by the year 2030, **20%** of the population will be 65 or older (compared with **13%** in 2010). New cases of Alzheimer's will rise by **35%**, while new cases of breast cancer are expected to rise by **50%**. You don't want to be included in those statistics—and there are many steps you can take now to reduce your chances of becoming one of those cases in the future.

Using my medical education and practice as well as my own very personal struggle as a woman in a middle-aged body, I crafted the *Younger* protocol to change the course of your aging body and grow your healthspan. The goal of the *Younger* protocol is to lengthen healthspan—the time in which you can thrive free from disease—by

SUPPLEMENT SUGGESTIONS

For women looking to age optimally and stay strong, the following supplements are some of those cited in Dr. Gottfried's book *Younger* as potentially health-enhancing:

- A multivitamin mineral supplement.
- Vitamin D for sleep regulation, bone health, and osteoporosis prevention.
- Activated charcoal tablets for detoxification or after eating a restaurant meal.
- According to Dr. Gottfried, "Resveratrol, which has been shown to fight the effects of aging on a cellular level and to mimic the benefits of caloric restriction. The dose is **200 mg** once per day."
- "Magnesium counters the stress response, helps your muscles release and may even enhance your sleep. Take **300 to 1,000 mg** a day, unless you have kidney disease, in which case you should consult your healthcare practitioner."
- "Lipoic acid can be helpful because even with a whole-foods diet, it's hard to get enough to keep your oxidant/antioxidant status in balance," Dr. Gottfried notes. "Lipoic acid repairs damaged cells, and it's one of the most crucial anti-aging, anti-inflammatory, and antioxidant agents you can ingest—or apply to your skin. Lipoic acid may also protect your bones as you age and keeps your cells sensitive to insulin so that your blood sugar doesn't climb."
- "Take omega-3 fatty acids—**1 to 2 grams** a day. It lowers your cortisol levels, increases lean body mass, and improves vagal tone as measured via heart rate variability."

leveraging epigenetics, the turning on and off of certain genes that age you prematurely. You have the power to increase your healthspan and get your body to work for you instead of against you. It's about the daily choices that defy your genetic tendencies and fight diseases of aging by turning on the right genes at the right time and in the right sequence.

For women in their 40s, I would hone the focus on FOOD, SLEEP, MOVE, and EXPOSE. For

women in their 50s, I would hone the focus on the postmenopausal aspects of SLEEP (keep bedroom 64 degrees or cooler to prevent hot flashes), MOVE (exercise to prevent osteoporosis and injury), EXPOSE, SOOTHE, and THINK (particularly the ways to silence the APOE4 gene for women. This gene is responsible for approximately **20%** of Alzheimer's cases; women who carry the APOE4 gene are more likely to get Alzheimer's than men.)

LE: Please cite the essential vitamins, anti-inflammatory herbs and other nutritional supplements that women should take every day.

SG: One of the biggest levers when it comes to aging is problems with blood sugar, which may occur whether you are overweight or not. For that reason, I'm a fan of berberine, an herb proven to reset insulin and blood sugar.

For daily use, I suggest a high-potency multivitamin that covers the B vitamins (particularly folic acid, since the MTHFR gene is commonly flawed among people in the United States), and minerals. For detoxification, I recommend n-acetyl-cysteine (NAC) and activated charcoal.

LE: You maintain an innovative practice that involves your rigorous study of patients' evidence-based medical testing, virtual consultations and online teaching programs for women who want to upgrade their health. Please describe a typical "virtual" patient in their 50s. How do you help them?

SG: My approach is the basic functional medicine process, which I've personalized over the past 20 years. I follow the GOTOIT heuristic, complete the functional medicine timeline, and complete the functional medicine matrix for every patient. Your readers can find this at: functionalmedicine.org/getstarted/IFMTools/

After 25,000 patients, I'd say my average is like the woman I had a session with today by Skype: a 59-year-old, healthy, active, and wise woman who eats well but feels more flat in terms of energy and cognition. Her libido is flagging and she wakes up at 4 am. Her joints are achier than 10 years ago, and she recently was diagnosed

with frozen shoulder. Her main question is whether she should consider bioidentical hormone therapy.

I help a woman like this by going through the functional medicine tool kit for intake, as a means to identify the root causes of her symptoms, and then apply the Gottfried Protocol:

Step 1: What are the micronutrient deficiencies and perhaps nutritional excesses that we could address to reduce "inflammaging"—the unfortunate hybrid of increasing inflammation, stiffness, and accelerated aging. For instance, this woman appears to have symptoms of inflammation and low estrogen, and we are performing confirmatory laboratory tests. She may have leaky gut and an overactive immune system. She could have a food intolerance. She drinks coffee and eats dairy and gluten, which may or may not be increasing inflammation. We will look at her DNA for specific SNPs that may guide us with her micronutrients and targeted lifestyle therapies, and ultimately with the question about hormone therapy.

Step 2: Are there herbal therapies that may address her root cause? For instance, the supplement called maca, derived from a root vegetable indigenous to the Andes Mountains, raises estrogen levels and has been shown in randomized trials to improve sex drive. If she has blood sugar issues, I may also add a supplement to help regulate blood sugar.

Step 3: If steps 1 and 2 do not resolve her symptoms, would a small-to-moderate dose of bioidentical hormone therapy be helpful? We will continue to have a very thorough conversation

about the risks, benefits, and alternatives of hormone therapy in the context of her values, philosophy, and quality of life.

Regarding hormones and the aging process, both men and women make less testosterone as they age, leading to more fat deposits at the breasts, hips, and buttocks. Women produce less estrogen, which normally protects the hair follicles and skin. Lower levels of estrogen and testosterone may weaken your bones and your sex drive, and furthermore, lower estrogen-to-testosterone ratios may trigger hair loss and heart disease.

Unfortunately, your thyroid gland slows down and, along with it, your metabolism, so the bathroom scale climbs a few pounds per year (or even per month). You get cold more easily. Your cells become increasingly insensitive to the hormone insulin, which leads to rising blood sugar in the morning. As a result of higher blood sugar, you may feel foggy and experience stronger cravings for carbs, then notice more skin wrinkling along with an older-looking facial appearance. The key point is that the right food, sleep, exercise, and support for detoxification can reverse many hormone problems associated with aging. ●

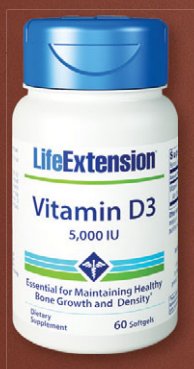
If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.

For more information, check out Dr. Sara Gottfried's website at: saragottfriedmd.com

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\$199

○ **FOOD SAFE ALLERGY TEST – BASIC** (LCM73001)**

This test measures delayed (IgG) food allergies for 95 common foods.

\$198

○ **FOOD SAFE ALLERGY TEST – EXTENDED** (LCM73002)**

This test measures delayed (IgG) food allergies to an additional 95 foods.

\$198

○ **FOOD SAFE ALLERGY TEST – COMBO** (LCM73003)**

This test measures delayed (IgG) food allergies to all 190 foods found in our Basic and Extended panels.

\$375

NEW GENETIC TESTING

○ **DNA GENETIC CANCER RISK PROFILE** (LC100057)**

With only a saliva sample, you can identify your risk for 25 hereditary cancers by analyzing 98 genes from your DNA including the well-known BRCA1, BRCA2, TP53, and APC. Not available in FL, NY, and RI.

\$299

○ **APOE GENETIC TEST FOR ALZHEIMER'S AND CARDIAC RISK ** (LC100059)**

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

\$149

In the cardiovascular system ApoE is involved in the transportation of fat molecules into your cells. E4 is associated with increased levels of cholesterol and triglycerides, which leads to atherosclerosis, heart disease and stroke.

BLOOD TEST PANELS

MALE LIFE EXTENSION PANEL (LC322582)

CBC/Chemistry Profile • DHEA-S • PSA (prostate-specific antigen) Homocysteine • C-Reactive Protein (high-sensitivity) Free Testosterone • Total Testosterone • Estradiol • TSH for thyroid function • Vitamin D (25-hydroxyvitamin D) • Hemoglobin A1c

MALE HORMONE ADD-ON PANEL* (LCADDM)

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 information about a testosterone metabolite that can affect the prostate; and the hormone pregnenolone that acts as a precursor to all other steroid hormones.

MALE ELITE PANEL (LC100016)*

CBC/Chemistry Profile • Free and Total Testosterone • Total Estrogens Estradiol • DHEA-S • Progesterone • Pregnenolone • DHT • FSH • LH • TSH Free T3 • Free T4 • Reverse T3 • Free and Total PSA • IGF-1 • SHBG • HbA1c Vitamin D 25-OH • hs-CRP, ferritin • Homocysteine • Hemoglobin A1c

MALE COMPREHENSIVE HORMONE PANEL (LC100010)*

CBC/Chemistry Profile • DHEA-S, Estradiol • DHT • PSA Pregnenolone • Total and Free Testosterone • SHBG • TSH • Free T3 This panel now includes Free T4 and Cortisol with no increase in price!

MALE BASIC HORMONE PANEL (LC100012)

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

THYROID ADD-ON PANEL (LCTHYROID)

Free T3 & Free T4.

OMEGA CHECK™** (LCOMEGA)

Provides valuable information on your risk of developing heart disease, sudden heart attack, and cardiac death. The Omega Check™ also includes your AA:EPA ratio, allowing you to determine and track a major factor in total body inflammation.

INSULIN (LC004333)

Helpful to assess insulin resistance.

NMR LIPOPROFILE® (LC123810)

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

ADVANCED OXIDIZED LDL PANEL* (LC100035)

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

YOUR PRICE

\$269

\$120

\$575

\$299

\$75

\$55

\$131.25

\$29.90

\$99

\$285

FEMALE LIFE EXTENSION PANEL (LC322535)

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

FEMALE HORMONE ADD-ON PANEL* (LCADDF)

Pregnenolone and Total Estrogen

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 information about total estrogen status and the hormone pregnenolone that acts as a precursor to all other steroid hormones.

FEMALE ELITE PANEL (LC100017)*

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

FEMALE COMPREHENSIVE HORMONE PANEL (LC100011)*

CBC/Chemistry Profile • DHEA-S, Estradiol • Total Estrogens Progesterone • Pregnenolone • Total and Free Testosterone • SHBG TSH • Free T3 This panel now includes Free T4 and Cortisol with no increase in price!

FEMALE BASIC HORMONE PANEL (LC100013)

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

WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028)

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

HEALTHY AGING PANEL-COMPREHENSIVE (LC100026)*

CBC/Chemistry Profile • C-reactive protein (high sensitivity) Vitamin B12 • Folate • Homocysteine • Vitamin D 25-hydroxy • Hemoglobin A1c TSH • Free T3 • Free T4 • Ferritin • Urinalysis • Fibrinogen • Insulin

DIABETES MANAGEMENT PROFILE – COMPREHENSIVE (LC100040)

Hemoglobin A1C • Glucose • Insulin • Lipid Panel • Glycomark

YOUR PRICE

\$269

\$125

\$575

\$299

\$75

\$275

\$249

\$129



With **Your Healthy Rewards**, you earn **LE Dollars** back on every purchase you make — including blood tests!

See www.LifeExtension.com/Rewards for details.

This is NOT a complete listing of LE blood test services. Call 1-800-208-3444 for additional information.

* 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.

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

Amino Acids

Arginine/L-Ornithine Capsules
Arginine Ornithine Powder
Branched Chain Amino Acids
D,L-Phenylalanine Capsules
L-Arginine Caps
L-Carnitine
L-Glutamine
L-Glutamine Powder
L-Lysine
L-Taurine Powder
L-Tyrosine Powder
Super Carnosine
Taurine

Blood Pressure & Vascular Support

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

Bone Health

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

Brain Health

Acetyl-L-Carnitine
Acetyl-L-Carnitine Arginate
Blast™
Brain Shield® Gastrodin
CocoaMind™
Cognitex® Basics
Cognitex® with Brain Shield®
Cognitex® with Pregnenolone & Brain Shield®
Cognizin® CDP-Choline Caps
DMAE Bitartrate (dimethylaminoethanol)
Dopa-Mind™
Ginkgo Biloba Certified Extract™
Huperzine A
Lecithin Granules
Memory Protect
Migra-Eeze™
Neuro-Mag® Magnesium L-Threonate
Neuro-Mag® Magnesium L-Threonate with Calcium and Vitamin D3
Optimized Ashwagandha Extract
PS (Phosphatidylserine) Caps
Vinpocetine

Cholesterol Management

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

Digestion Support

Artichoke Leaf Extract
Digest RC®
Effervescent Vitamin C - Magnesium Crystals
Enhanced Super Digestive Enzymes
Enhanced Super Digestive Enzymes w/Probiotics
EsophaCool™
Esophageal Guardian

Extraordinary Enzymes
Fiber-Immune Support
Gastro-Ease™
Ginger Force®
Pancreatin
Regimint
Tranquil Tract™
TruFiber™
WellBetX PGX plus Mulberry

Energy Management

Adrenal Energy Formula
Asian Energy Boost
D-Ribose Powder
D-Ribose Tablets
Forskolin
Mitochondrial Basics with BioPQQ®
Mitochondrial Energy Optimizer with BioPQQ®
NAD+ Cell Regenerator™
Optimized NAD+ Cell Regenerator™ with Resveratrol
PQQ Caps with BioPQQ®
Rhodiola Extract
RiboGen™ French Oak Wood Extract
Triple Action Thyroid

Eye Health

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

Fish Oil & Omegas

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

Food

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

Glucose Management

CinSulin® with InSea2® and Crominex® 3+
Mega Benfotiamine
Tri Sugar Shield®

Heart Health

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

Hormone Balance

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

Immune Support

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

Inflammation Management

5-LOX Inhibitor with AprèsFlex®
Advanced Bio-Curcumin® with Ginger & Turmerones
Black Cumin Seed Oil
Black Cumin Seed Oil with Bio-Curcumin®
Boswellia
Cytokine Suppress™ with EGCG
Serrafazyme
Specially-Coated Bromelain
Super Bio-Curcumin®
Zyflamend® Whole Body

Joint Support

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

Kidney & Bladder Support

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

Liver Health & Detoxification

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

Longevity & Wellness

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

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

Men's Health

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

Minerals

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

Miscellaneous

Potassium Iodide
Solarshield® Sunglasses

Mood & Stress Management

5 HTP
L-Theanine
Natural Cortisol Balance
Natural Stress Relief
SAmE (S-Adenosyl-Methionine)

Multivitamins

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

Personal Care

Anti-Aging Rejuvenating Scalp Serum
Biosil
Dr. Proctor's Advanced Hair Formula
Dr. Proctor's Shampoo
European Leg Solution Featuring Certified
Diosmin 95
Face Master Platinum Facial Toning System

Hair, Skin & Nail Rejuvenation Formula
w/VERISOL®
Hair Suppress Formula
Life Extension Toothpaste
Sinus Cleanser
Venotone
Xyliwhite Mouthwash

Pet Care

Cat Mix
Dog Mix

Probiotics

Bifido GI Balance
FLORASSIST® Balance
FLORASSIST® GI with Phage Technology
FLORASSIST® Heart Health
FLORASSIST® Mood
FLORASSIST® Oral Hygiene
FLORASSIST® Throat Health
Jarro-Dophilus® for Women
Theralac® Probiotics
TruFlora® Probiotics

Skin Care

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

Sleep

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

Sports Performance

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

Vitamins

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

Weight Management

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

Women's Health

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

		YOUR PRICE				
ITEM No.	PRODUCT	Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each	QTY Total
A						
01524	ACETYL-L-CARNITINE • 500 mg, 100 veg. caps	34.00	25.50	22.50		
01874	ACETYL-L-CARNITINE ARGINATE • 90 veg. caps	52.00	39.00	35.00		
01628	ADRENAL ENERGY FORMULA • 60 veg. caps	24.00	18.00	16.50		
01630	ADRENAL ENERGY FORMULA • 120 veg. caps	46.00	34.50	31.50		
01828	ADVANCED LIPID CONTROL • 60 veg. caps	30.00	22.50	20.25		
02119	AGELESS CELL™ • 30 softgels	40.00	30.00	27.00		
00681	AHCC® • 500 mg, 30 caps	59.98	44.99			
24404	AHCC® (KINOKO® PLATINUM) • 750 mg, 60 veg. caps	84.95	63.71			
29727	AHCC® (KINOKO® GOLD) • 500 mg, 60 veg. caps	74.95	52.47			
00457	ALPHA-LIPOIC ACID W/BIOTIN • 250 mg, 60 caps	37.00	27.75	24.00		
01907	AMPK ACTIVATOR • 90 veg. caps	48.00	36.00	33.00		
01509	ANTI-ADIPOCYTE FORMULA W/MERATRIM® & INTEGRA LEAN® (Advanced) • 60 veg. caps	39.00	29.25	27.00		
02140	ANTI-ALCOHOL w/HEPATOPRO COMPLEX • 60 caps	22.00	16.50	15.00		
01625	APPLEWISE POLYPHENOL EXTRACT 600 mg, 30 veg. caps	21.00	15.75	14.25		
01039	ARGININE/ORNITHINE • 500/250, 100 caps	17.99	13.49			
00038	ARGININE/ORNITHINE POWDER • 150 grams	22.95	17.21	14.25		
01624	(L)-ARGININE CAPS • 700 mg, 200 veg. caps	26.50	19.88	17.44		
02004	ARTERIAL PROTECT • 30 veg. caps	44.00	33.00	29.00		
01617	ARTHROMAX® W/THEAFLAVINS & APRÈSFLEX® 120 veg. caps	44.00	33.00	30.00		
01618	ARTHROMAX® ADVANCED W/UC-II® & APRÈSFLEX® 60 caps	36.00	27.00	24.00		
02108	ARTHROMAX® HERBAL JOINT FORMULA • 60 veg. caps	40.00	30.00	27.00		
01404	ARTHRO-IMMUNE JOINT SUPPORT • 60 veg. caps	32.00	24.00	21.00		
00919	ARTICHOKE LEAF EXTRACT • 500 mg, 180 veg. caps	30.00	22.50	21.00		
01533	ASCORBYL PALMITATE • 500 mg, 100 veg. caps	22.50	16.88	15.00		
00888	ASHWAGANDHA EXTRACT (Optimized) • 60 veg. caps	10.00	7.50	6.75		
01805	ASIAN ENERGY BOOST • 90 veg. caps	24.00	18.00	16.50		
01066	ASPIRIN • 81 mg, 300 enteric coated tablets	6.00	4.50	4.00		
01923	ASTAXANTHIN WITH PHOSPHOLIPIDS • 4 mg, 30 softgels	16.00	12.00	10.50		
B						
00920	BENFOTIAMINE W/ THIAMINE • 100 mg, 120 veg. caps	19.95	14.96	13.95		
00925	BENFOTIAMINE (Mega) • 250 mg, 120 veg. caps	30.00	22.50	20.25		
01206	BERRY COMPLETE • 30 veg. caps	21.00	15.75	14.00		
01496	BERRY COMPLETE W/ACAI (Enhanced) • 60 veg. caps	29.00	21.75	19.50		
00664	BETA-CAROTENE • 25,000 IU, 100 softgels	11.50	8.63			
01622	BIFIDO GI BALANCE • 60 veg. caps	20.00	15.00	13.50		
01873	BILBERRY EXTRACT • 100 mg, 90 veg. caps	36.00	27.00	24.00		
01512	BIOACTIVE MILK PEPTIDES • 30 caps	18.00	13.50	12.00		
01631	BIO-COLLAGEN W/PATENTED UC-II® • 40 mg, 60 small caps	36.00	27.00	24.00		
*01006	BIOSIL™ • 5 mg, 30 veg. caps	19.99	15.99			
*01007	BIOSIL™ • 1 fl oz	31.99	25.59			
00102	BIOTIN • 600 mcg, 100 caps	7.50	5.63	4.88		
01709	BLACK CUMIN SEED OIL • 60 softgels	16.00	12.00	10.50		
01710	BLACK CUMIN SEED OIL W/BIO-CURCUMIN® • 60 softgels	32.00	24.00	22.50		
SUBTOTAL OF COLUMN 1						

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
01008	BLAST™ • 600 grams of powder	26.95	20.21				
02025	BLOOD PRESSURE (Dual Action) • 60 veg. tabs	44.00	33.00	28.00			
70000	BLOOD PRESSURE MONITOR (ACCUFIT™) • med/lg cuff	79.99	49.99				
70004	BLOOD PRESSURE MONITOR • Digital wrist cuff	69.95	52.46				
02024	BLOOD PRESSURE (Triple Action AM/PM) • 60 veg. tabs	44.00	33.00	28.00			
01214	BLUEBERRY EXTRACT • 60 veg. caps	22.50	16.88	15.00			
01438	BLUEBERRY EXTRACT W/ POMEGRANATE • 60 veg. caps	30.00	22.50	20.25			
01506	BONE FORMULA (DR. STRUM'S INTENSIVE) • 300 caps	56.00	42.00	37.50			
01726	BONE RESTORE • 120 caps	22.00	16.50	14.25			
01727	BONE RESTORE W/VITAMIN K2 • 120 caps	24.00	18.00	16.50			
01725	BONE STRENGTH FORMULA W/KOACT® • 120 caps	45.00	33.75	30.00			
00313	BONE-UP® • 240 caps	28.95	21.71	20.41			
01661	BORON • 3 mg, 100 veg. caps	5.95	4.46	3.94			
00202	BOSWELLA • 100 caps	38.00	28.50	22.50			
01802	BRAIN SHIELD® GASTRODIN • 300 mg, 60 veg. caps	33.00	24.75	22.50			
01253	BRANCHED CHAIN AMINO ACIDS • 90 caps	19.50	14.63	12.75			
01942	BREAST HEALTH FORMULA • 60 caps	34.00	25.50	22.50			
00893	BRITE EYES III • 2 vials, 5 ml each	34.00	25.50	24.00			
01203	BROMELAIN (Specially-coated) 500 mg, 60 enteric coated tablets	21.00	15.75	14.25			
C							
01653	CALCIUM CITRATE W/VITAMIN D • 300 caps	24.00	18.00	15.94			
01651	CALCIUM D-GLUCARATE • 200 mg, 60 veg. caps	18.00	13.50	11.25			
01823	CALREDUCE SELECTIVE FAT BINDER 120 mint chewable tablets	45.00	33.75	28.50			
01700	CARDIO PEAK™ w/STANDARDIZED HAWTHORN & ARJUNA 120 veg. caps	36.00	27.00	24.00			
00916	CARNITINE W/GLYCOCARN® (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01532	L-CARNITINE • 500 mg, 30 veg. caps	15.00	11.25	9.90			
01829	CARNOSINE • 500 mg, 60 veg. caps	36.00	27.00	24.00			
02020	CARNOSINE (Super) • 500 mg, 60 veg. caps	40.00	30.00	27.00			
01932	CAT MIX • 100 grams powder	14.00	10.50	8.25			
01899	CHILDREN'S FORMULA LIFE EXTENSION MIX™ 100 chewable tablets	20.00	15.00	13.50			
00550	CHLORELLA • 500 mg, 200 tablets	23.98	17.99				
01571	CHLOROPHYLLIN • 100 mg, 100 veg. caps	24.00	18.00	15.00			
01359	CHO-LESS™ • 90 capsules	35.00	26.25				
01910	CHOL-SUPPORT™ • 60 liquid veg. caps	48.00	36.00	32.00			
01504	CHROMIUM W/CROMINEX® 3+ (Optimized) 500 mcg, 60 veg. caps	9.00	6.75	6.00			
01503	CINSULIN® W/INSEAZ® AND CROMINEX® 3+ • 90 veg. caps	38.00	28.50	25.50			
01906	CISTANCHE (Standardized) • 30 veg. caps	20.00	15.00	12.00			
01818	CITRIMAX® (Super) • 180 veg. caps	40.00	30.00	28.50			
00818	CLA BLEND W/SESAME LIGNANS (Super) 120 softgels	36.00	27.00	24.75	19.75		
02103	COCOAMIND™ • 14 packets	24.00	18.00	16.00			
01896	COGNITEX® W/BRAIN SHIELD® • 90 softgels	60.00	45.00	39.00	36.00		
01897	COGNITEX® W/PREGNENOLONE & BRAIN SHIELD® 90 softgels	62.00	46.50	39.75	37.50		
SUBTOTAL OF COLUMN 2							

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
01421	COGNITEX® BASICS • 60 softgels	38.00	28.50	26.25	24.00		
01659	COGNIZIN® CDP CHOLINE CAPS • 250 mg, 60 veg. caps	36.00	27.00	25.50			
01945	COMPLETE B-COMPLEX (BioActive) • 60 veg. caps	12.00	9.00	8.00			
02198	COMPREHENSIVE NUTRIENT PACKS ADVANCED • 30 packs	90.00	67.50	61.50			
01949	COQ10 w/d-LIMONENE (Super-Absorbable) • 50 mg, 60 softgels	25.00	18.75	16.50	15.00		
01948	COQ10 w/d-LIMONENE (Super-Absorbable) 100 mg, 100 softgels	46.00	34.50	28.00	26.25		
01951	COQ10 w/d-LIMONENE (Super-Absorbable) 100 mg, 60 softgels	30.00	22.50	20.00			
01929	COQ10 (Super Ubiquinol) • 100 mg, 60 softgels	56.00	42.00	36.00	33.00		
01733	COQ10 w/BIOPOQ® (Super Ubiquinol) • 100 mg, 30 softgels	54.00	40.50	33.00	30.00		
01426	COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super Ubiquinol) • 100 mg, 60 softgels	62.00	46.50	39.00	36.00		
01425	COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super Ubiquinol) • 50 mg, 100 softgels	58.00	43.50	34.50	31.50		
01427	COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super Ubiquinol) • 50 mg, 30 softgels	20.00	15.00	12.00			
01431	COQ10 w/ENH MITOCHONDRIAL SUPPORT™ (Super Ubiquinol) • 200 mg, 30 softgels	62.00	46.50	39.00	36.00		
00862	CRAN-MAX® • 500 mg, 60 veg. caps	17.50	13.13	11.25			
01424	CRAN-MAX® WITH ELLIROSE™ (Optimized) • 60 veg. caps	18.00	13.50	12.00			
01529	CREATINE CAPSULES • 120 veg. caps	10.95	8.21	6.94			
01746	CREATINE WHEY GLUTAMINE POWDER • 454 grams (vanilla)	30.00	22.50	19.50			
01429	CR MIMETIC LONGEVITY FORMULA • 60 veg. caps	39.00	29.25	27.00			
00407	CURCUMIN® (Super Bio) • 400 mg, 60 veg. caps	38.00	28.50	26.25			
01924	CURCUMIN® W/GINGER & TURMERONES (Advanced Bio) 30 softgels	30.00	22.50	20.25			
01804	CYTOKINE SUPPRESS™ W/EGCG • 30 veg. caps	30.00	22.50	20.25			
COSMESIS							
80157	ADVANCED ANTI-GLYCATION PEPTIDE SERUM • 1 oz	53.00	39.75	34.50			
80165	ADVANCED GROWTH FACTOR SERUM • 30 ml	65.00	48.75	42.75			
80154	ADVANCED LIGHTENING CREAM • 1 oz	65.00	48.75	42.75			
80155	ADVANCED PEPTIDE HAND THERAPY • 4 oz	46.00	34.50	29.25			
80152	ADVANCED TRIPLE PEPTIDE SERUM • 1 oz	65.00	48.75	42.75			
80140	ADVANCED UNDER EYE SERUM W/STEM CELLS • .33 oz	49.00	36.75	31.50			
80139	AMBER SELF MICRODERMABRASION • 2 oz	49.00	36.75	31.50			
80158	ANTI-AGING FACE OIL • 1 oz	59.00	44.25	39.00			
80118	ANTI-AGING MASK • 2 oz	72.00	54.00	47.52			
80151	ANTI-AGING REJUVENATING FACE CREAM • 2 oz	65.00	48.75	42.75			
80153	ANTI-AGING REJUVENATING SCALP SERUM • 2 oz	46.00	34.50	29.25			
80134	ANTI-GLYCATION SERUM W/BLEBERRY & POMEGRANATE EXTRACTS • 1 oz	33.00	24.75	23.51			
80133	ANTIOXIDANT FACIAL MIST • 2 oz	32.00	24.00	22.80			
80105	ANTI-REDNESS & ADULT BLEMISH LOTION • 1 oz	74.50	55.88	49.17			
80144	BROCCOLI SPROUT CREAM • 1 oz	46.00	34.50	29.25			
80156	COLLAGEN BOOSTING PEPTIDE SERUM • 1 oz	59.00	44.25	39.00			
80141	DNA REPAIR CREAM • 1 oz	49.00	36.75	31.50			
80108	ESSENTIAL PLANT LIPIDS REPARATIVE SERUM • 1 oz	74.95	56.21	49.46			
80163	EYE LIFT CREAM • 0.5 fl oz	59.00	44.25	39.00			
80123	FACE REJUVENATING ANTIOXIDANT CREAM • 2 oz	69.50	52.13	45.87			
SUBTOTAL OF COLUMN 3							

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
80107	FINE LINE-LESS • 1 oz	74.50	55.88	49.17			
80137	HEALING FORMULA ALL-IN-ONE CREAM • 1 oz	53.00	39.75	34.07			
80102	HEALING VITAMIN K CREAM • 1 oz	79.50	59.63	52.47			
80109	HYALURONIC FACIAL MOISTURIZER • 1 oz	58.00	43.50	38.28			
80110	HYALURONIC OIL-FREE FACIAL MOISTURIZER • 1 oz	58.00	43.50	38.28			
80138	HYDRATING ANTIOXIDANT FACE MIST • 4 oz	39.95	29.96	28.50			
80103	LIFTING & TIGHTENING COMPLEX • 1 oz	74.50	55.88	49.17			
80135	MELATONIN CREAM • 1 oz	33.00	24.75	20.33			
80114	MILD FACIAL CLEANSER • 8 fl. oz	59.00	44.25	38.94			
80159	MULTI STEM CELL SKIN TIGHTENING COMPLEX • 1 oz	59.00	44.25	39.00			
80122	NECK REJUVENATING ANTIOXIDANT CREAM • 2 oz	64.00	48.00	42.24			
80150	RENEWING EYE CREAM • 1/2 oz	65.00	48.75	42.75			
80142	RESVERATROL ANTI-OXIDANT SERUM • 1 oz	46.00	34.50	29.25			
80112	SKIN LIGHTENING SERUM • 1/2 oz	85.00	63.75	56.10			
80130	SKIN STEM CELL SERUM • 1 oz	74.00	55.50	51.75			
80164	SKIN TONE EQUALIZER • 0.4 fl oz	59.00	44.25	39.00			
80143	STEM CELL CREAM W/ALPINE ROSE • 1 oz	66.00	49.50	43.50			
80148	TIGHTENING & FIRMING NECK CREAM • 2 oz	39.00	29.25	26.25			
80161	TRIPLE ACTION VITAMIN C CREAM • 1 oz jar	59.00	44.25	39.00			
80162	ULTIMATE MICRODERMABRASION • 8 fl. oz	39.00	29.25	26.25			
80160	ULTRA EYELASH BOOSTER • 0.25 oz (2 units \$39)	59.00	44.25				
80116	ULTRA LIP PLUMPER • 1/3 oz	64.00	48.00	42.24			
80101	ULTRA WRINKLE RELAXER • 1 oz	89.95	67.46	59.82			
80113	UNDER EYE REFINING SERUM • 1/2 oz	74.50	55.88	49.17			
80104	UNDER EYE RESCUE CREAM • 1/2 oz	74.50	55.88	49.17			
80129	VITAMIN C SERUM • 1 oz	85.00	63.75	56.10			
80136	VITAMIN D LOTION • 4 oz	36.00	27.00	25.25			
80145	VITAMIN E-ESSENTIAL CREAM • 1 oz	28.00	21.00	19.50			
80149	YOUTH SERUM • 1 oz	65.00	48.75	42.75			
D							
00658	7-KETO® DHEA METABOLITE • 25 mg, 100 caps	28.00	21.00	18.00			
01479	7-KETO® DHEA METABOLITE • 100 mg, 60 veg. caps	40.00	30.00	27.00			
01640	DHA (Vegetarian) • 30 veg. softgels	20.00	15.00	13.50			
00607	DHEA • 25 mg, 100 tablets (Dissolve in mouth)	14.00	10.50	8.81			
01478	DHEA COMPLETE • 60 veg. caps	48.00	36.00	32.40			
00335	DHEA • 25 mg, 100 caps	16.00	12.00	11.00			
00454	DHEA • 15 mg, 100 caps	14.00	10.50	9.00			
00882	DHEA • 50 mg, 60 caps	19.00	14.25	12.75			
01689	DHEA • 100 mg, 60 veg. caps	24.00	18.00	16.50			
01358	DIGEST RC® • 30 tablets	19.95	14.96	12.75			
02021	DIGESTIVE ENZYMES (Enhanced Super) • 60 veg. caps	22.00	16.50	15.00			
02022	DIGESTIVE ENZYMES w/PROBIOTICS (Enhanced Super)•60 veg. caps	28.00	21.00	18.00			
01671	D, L-PHENYLALANINE • 500 mg, 100 veg. caps	18.75	14.06	12.00			
01540	DMAE BITARTRATE • 150 mg, 200 veg. caps	18.00	13.50	11.25			
01570	DNA PROTECTION FORMULA • 60 veg. caps	34.00	25.50	24.00			
01931	DOG MIX • 100 grams powder	18.00	13.50	11.25			
SUBTOTAL OF COLUMN 4							

ITEM No.	PRODUCT	YOUR PRICE					QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each	I		
02006	DOPA-MIND™ • 60 veg. tabs	44.00	33.00	28.00				
00321	DR. PROCTOR'S ADVANCED HAIR FORMULA • 2 oz	39.95	29.96	24.00				
00320	DR. PROCTOR'S HAIR SHAMPOO • 8 oz	24.95	18.71	16.50				
E								
01997	ENDOTHELIAL DEFENSE™ w/POMEGRANATE COMPLETE AND CORDIART™ • 60 softgels	68.00	51.00	46.50				
00997	ENDOTHELIAL DEFENSE™ w/GLISODIN® • 60 veg. caps	54.00	40.50	36.00				
01937	EPA/DHA (Mega) • 120 softgels	20.00	15.00	13.50				
02009	ESOPHACOO™ • 120 chewable tablets	20.00	15.00	13.50				
01737	ESOPHAGEAL GUARDIAN (Berry flavor) • 60 chewable tablets	36.00	27.00	24.00				
01042	EUROPEAN LEG SOLUTION DIOSMIN 95 600 mg, 30 veg. tabs	20.00	15.00	13.50				
01706	EXTRAORDINARY ENZYMES • 60 caps	26.00	19.50	18.00				
02008	(CALIFORNIA ESTATE) EXTRA VIRGIN OLIVE OIL • 500 ml (16.9 fl. oz)	33.00	24.75	22.50				
01514	EYE PRESSURE SUPPORT W/MIRTOGENOL® • 30 veg. caps	38.00	28.50	25.50				
F								
01054	FACE MASTER® PLATINUM • Facial Toning System	199.00	199.00					
00965	FAST-ACTING JOINT FORMULA • 30 caps	39.00	29.25	27.00				
01717	FAST-C® W/DIHYDROQUERCETIN • 120 veg. tabs	26.00	19.50	18.00				
01064	FEMMENESSENCE MACAPAUSE® • 120 veg. caps	34.99	26.24					
02007	FIBER-IMMUNE SUPPORT (Apple Cinnamon) • 235 grams	34.00	25.50	23.50				
02125	FLORASSIST® GI w/PHAGE TECHNOLOGY • 30 liquid veg. caps	33.00	24.75	22.50				
01821	FLORASSIST® HEART HEALTH • 60 veg. caps	32.00	24.00	21.00				
02120	FLORASSIST® ORAL HYGIENE • 30 lozenges	20.00	15.00	13.00				
01825	FLORASSIST® BALANCE • 30 liquid veg. caps	32.00	24.00	21.00				
02000	FLORASSIST® MOOD • 60 caps	33.00	24.75	22.50				
01920	FLORASSIST® THROAT HEALTH • 30 lozenges	20.00	15.00	13.50				
01913	FOLATE HIGH POTENCY (Optimized) • 5,000 mcg, 30 veg. tablets	18.00	13.50	12.00				
01939	FOLATE (Optimized) • 1,000 mcg, 100 veg. tablets	15.00	11.25	10.00				
01842	FOLATE + VITAMIN B12 (BioActive) • 90 veg. caps	12.00	9.00	8.00				
01544	FORSKOLIN • 10 mg, 60 veg. caps	16.00	12.00	10.50				
01513	FUCOIDAN W/MARITECH® 926 (Optimized) • 60 veg. caps	36.00	27.00	24.75				
G								
02070	GAMMA E MIXED TOCOPHEROL/TOCOTRIENOLS • 60 softgels	40.00	30.00	27.00				
02075	GAMMA E MIXED TOCOPHEROL w/ENHANCED SESAME LIGNANS • 60 softgels	32.00	24.00	21.75				
01394	GARLIC (Optimized) • 200 veg. caps	24.95	18.71	15.75				
02100	GASTRO-EASE™ • 60 veg. caps	44.00	33.00	30.00				
01122	GINGER FORCE® • 60 liquid caps	34.95	26.21					
01658	GINKGO BILOBA CERTIFIED EXTRACT™ 120 mg, 365 veg. caps	50.00	37.50	33.00				
00756	GLA WITH SESAME LIGNANS (Mega) • 60 softgels	19.50	14.63	13.50				
00345	(L-) GLUTAMINE CAPSULES • 500 mg, 100 veg. caps	14.95	11.21	10.13				
00141	(L-) GLUTAMINE POWDER • 100 grams	22.00	16.50	15.00				
00522	GLUCOSAMINE/CHONDROITIN CAPSULES • 100 caps	38.00	28.50	24.00				
01541	GLUTATHIONE, CYSTEINE & C • 100 veg. caps	20.00	15.00	13.50				
01669	GLYCINE • 1,000 mg, 100 veg. caps	12.00	9.00	8.10				
01411	GRAPE SEED EXTRACT W/RESVERATROL & PTEROSTILBENE 100 mg, 60 veg. caps	36.00	27.00	25.50				
SUBTOTAL OF COLUMN 5								

ITEM No.	PRODUCT	YOUR PRICE					QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each	I		
01620	GREEN COFFEE EXTRACT COFFEENIC® 400 mg, 90 veg. caps	32.00	24.00	21.00				
00953	GREEN TEA EXTRACT (Mega) • lightly caffeinated, 100 veg. caps	30.00	22.50	18.00				
00954	GREEN TEA EXTRACT (Mega) • decaffeinated, 100 veg. caps	30.00	22.50	18.00				
H								
01074	5 HTP • 100 mg, 60 caps	27.95	20.96					
02002	HAIR, SKIN & NAIL REJUVENATION FORM W/VERISOL® 90 tabs	32.00	24.00	22.00				
01738	HCA (Garcinia) • 90 veg. caps	17.00	12.75	11.25				
29754	HCACTIVE™ GARCINIA CAMBOGIA EXTRACT • 90 caps	30.00	22.50					
01393	HEPATOPRO • 900 mg, 60 softgels	50.00	37.50	34.50				
02121	HOMOCYSTEINE RESIST • 60 veg. caps	26.00	19.50	17.50				
01527	HUPERZINE A • 200 mcg, 60 veg. caps	40.00	30.00	27.00				
00661	HYDRODERM® • 1 oz	79.95	59.96	49.00				
I								
01704	IMMUNE MODULATOR W/TINOFEND® • 60 veg. caps	17.00	12.75	11.25				
00955	IMMUNE PROTECT W/PARACTIN® • 30 veg. caps	29.50	22.13	19.91				
02005	IMMUNE SENESCENCE PROTECTION FORMULA™ • 60 veg. tabs	40.00	30.00	27.00				
01049	INNERPOWER™ • 530 grams powder	42.00	31.50					
01674	INOSITOL CAPSULES • 1,000 mg, 360 veg. caps	62.00	46.50	43.50				
01292	INTEGRA-LEAN® AFRICAN MANGO IRVINGIA 150 mg, 60 veg. caps	28.00	21.00	18.00				
30731	IONIC SELENIUM • 2 oz, 300 mcg	13.69	10.27					
01677	IRON PROTEIN PLUS • 300 mg, 100 caps	28.00	21.00	19.50				
01492	IRVINGIA W/PHASE 3™ CALORIE CONTROL COMPLEX (Optimized African Mango) • 120 veg. caps	56.00	42.00	36.00				
J, K, L								
52142	JARRO-DOPHILUS® PROBIOTIC FOR WOMEN 30 enteric-coated veg. caps	27.95	20.96					
00056	JARRO-DOPHILUS EPS® • 60 veg. caps	23.95	17.96					
01834	K W/ADVANCED K2 COMPLEX (Super) • 90 softgels	30.00	22.50	20.25				
01600	KRILL HEALTHY JOINT FORMULA • 30 softgels	32.00	24.00	21.75				
01050	KRILL OIL (Jarrow) • 60 softgels	33.95	25.46					
00316	KYOLIC® GARLIC FORMULA 102 • 200 veg. caps	27.45	20.59					
00789	KYOLIC® RESERVE • 600 mg, 120 caps	28.95	21.71					
01681	LACTOFERRIN • 60 caps	44.00	33.00	30.00				
00020	LECITHIN • 16 oz granules	18.00	13.50	12.00				
02155	LIFE EXTENSION MIX™ • 315 tablets	80.00	60.00	52.00	43.75			
02157	LIFE EXTENSION MIX™ W/EXTRA NIACIN • 315 tablets	80.00	60.00	52.00	43.75			
02154	LIFE EXTENSION MIX™ • 490 caps	90.00	67.50	58.00	47.50			
02156	LIFE EXTENSION MIX™ POWDER • 14.81 oz	80.00	60.00	52.00	43.75			
02165	LIFE EXTENSION MIX™ • 315 tablets w/o copper	80.00	60.00	52.00	43.75			
02164	LIFE EXTENSION MIX™ • 490 caps w/o copper	90.00	67.50	58.00	47.50			
02166	LIFE EXTENSION MIX™ POWDER • 14.81 oz w/o copper	80.00	60.00	52.00	43.75			
01608	LIVER EFFICIENCY FORMULA • 30 veg. caps	18.00	13.50	12.00				
01639	5-LOX INHIBITOR W/APRÈSFLEX® • 100 mg, 60 veg. caps	22.00	16.50	15.00				
01678	L-LYSINE • 620 mg, 100 veg. caps	9.00	6.75	6.00				
00455	LYCOPENE (Mega) • 15 mg, 90 softgels	35.00	26.25	22.50				
SUBTOTAL OF COLUMN 6								

		YOUR PRICE					
ITEM No.	PRODUCT	Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each	QTY	Total
M							
01992	MACUGUARD® OCULAR SUPPORT w/SAFFRON• 60 softgels	25.00	18.75	17.50			
01993	MACUGUARD® OCULAR SUPPORT w/SAFFRON & ASTAXANTHIN• 60 softgels	44.00	33.00	30.00			
01459	MAGNESIUM CAPS • 500 mg, 100 veg. caps	12.00	9.00	7.50			
01682	MAGNESIUM (CITRATE) • 160 mg, 100 veg. caps	12.00	9.00	7.50			
02107	(EXTEND-RELEASE) MAGNESIUM • 60 veg. caps	13.00	9.75	8.75			
01908	MEDITERRANEAN TRIM WITH SINETROL™-XPUR 60 veg. caps	18.00	13.50	12.00			
02109	MEDITERRANEAN WHOLE FOOD BLEND • 90 veg. caps	44.00	33.00	30.00			
01668	MELATONIN • 300 mcg, 100 veg. caps	5.75	4.31	3.75			
01083	MELATONIN • 500 mcg, 200 veg. caps	18.00	13.50	12.00			
00329	MELATONIN • 1 mg, 60 caps	5.00	3.75	3.47			
00330	MELATONIN • 3 mg, 60 veg. caps	8.00	6.00	5.16			
00331	MELATONIN • 10 mg, 60 veg. caps	28.00	21.00	18.00			
00332	MELATONIN • 3 mg, 60 veg. lozenges	8.00	6.00	5.16			
01734	MELATONIN (Fast-Acting Liquid) • 2 fl. oz (Citrus-Vanilla)	12.00	9.00	8.25			
01787	MELATONIN TIMED RELEASE • 300 mcg, 100 veg. tabs	12.00	9.00	8.25			
01788	MELATONIN TIMED RELEASE • 750 mcg, 60 veg. tablets	8.00	6.00	5.25			
01786	MELATONIN TIMED RELEASE • 3 mg, 60 veg. tabs	12.00	9.00	8.25			
02101	MEMORY PROTECT • 36 day supply	24.00	18.00	16.00			
01536	METHYLCOBALAMIN • 1 mg, 60 veg. lozenges (vanilla)	9.95	7.46	6.00			
01537	METHYLCOBALAMIN • 5 mg, 60 veg. lozenges (vanilla)	32.00	24.00	18.75	17.25		
00709	MIGRA-EEZE™ (Butterbur) • 60 softgels	33.00	24.75	22.00			
01522	MILK THISTLE (European) • 60 veg. caps	34.00	25.50	22.50			
01922	MILK THISTLE (European) • 60 softgels	28.00	21.00	18.75			
01925	MILK THISTLE (European) • 120 softgels	44.00	33.00	30.00			
01940	MIRAFORTE w/STANDARDIZED LIGNANS (Super) • 120 veg caps	62.00	46.50	42.00			
01869	MITOCHONDRIAL BASICS W/BIOPQQ® • 30 caps	44.00	33.00	30.00			
01868	MITOCHONDRIAL ENERGY OPTIMIZER w/BIOPQQ®•120 caps	72.00	54.00	48.00			
00065	MK-7 • 90 mcg, 60 softgels	28.00	21.00	18.75			
00451	MSM (Methylsulfonylmethane) • 1,000 mg, 100 caps	14.00	10.50	8.96			
N							
01534	N-ACETYL-L-CYSTEINE • 600 mg, 60 veg. caps	14.00	10.50	9.25			
01904	NAD+ CELL REGENERATOR™ • 100 mg, 30 veg. caps	22.00	16.50	15.00			
02144	NAD+ CELL REGENERATOR™ NICOTINAMIDE RIBOSIDE 250 mg, 30 veg. caps	42.00	31.50	28.00			
02145	NAD+ CELL REGENERATOR™ W/RESVERATROL (Optimized) 30 veg. caps	50.00	37.50	34.00			
01807	NATURAL APPETITE SUPPRESS (Advanced) • 60 veg. caps	38.00	28.50	25.50			
00984	NATURAL BP MANAGEMENT • 60 tablets	44.00	33.00	30.00			
02012	NATURAL CORTISOL BALANCE • 30 veg. caps	45.00	33.75	30.00			
01892	NATURAL ESTROGEN • 60 veg. tabs	38.00	28.50	25.50			
01626	NATURAL SEX FOR WOMEN® 50+ (Advanced)•90 veg. caps	59.00	44.25	34.00			
01444	NATURAL SLEEP® • 60 veg. caps	13.00	9.75	7.50			
01551	NATURAL SLEEP® w/ MELATONIN (Enhanced) • 30 caps	22.00	16.50	15.00			
01511	NATURAL SLEEP® W/O MELATONIN (Enhanced) • 30 caps	20.00	15.00	13.50			
01445	NATURAL SLEEP® MELATONIN • 5 mg, 60 veg. caps	18.00	13.50	12.00			
SUBTOTAL OF COLUMN 7							

RECEIVE 25% OFF THE RETAIL PRICE OF ALL PRODUCTS

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
00987	NATURAL STRESS RELIEF • 30 veg. caps	28.00	21.00	18.00			
01603	NEURO-MAG® MAGNESIUM L-THREONATE • 90 veg. caps	40.00	30.00	27.00			
01602	NEURO-MAG® MAGNESIUM L-THREONATE w/CALCIUM & VITAMIN D3 • 225 grams • Lemon flavor	40.00	30.00	27.00			
01990	NITROVASC w/CORDIART™ • 30 veg. caps	18.00	13.50	12.00			
01903	NK CELL ACTIVATOR™ • 30 veg. tablets	45.00	33.75	31.50			
00373	NO FLUSH NIACIN • 800 mg, 100 caps	19.00	14.25	12.75			
O							
01824	OLIVE LEAF VASCULAR SUPPORT w/CELERY SEED EXTRACT (Advanced) • 60 veg. caps	36.00	27.00	24.00			
01988	OMEGA-3 PLUS EPA/DHA w/SESAME LIGNANS, OLIVE EXTRACT, KRILL & ASTAXANTHIN (SUPER) • 120 softgels	45.00	33.75	31.50	24.75		
01983	OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT (Super) • 60 softgels	18.00	13.50	12.00	9.38		
01982	OMEGA-3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT (Super) • 120 softgels	32.00	24.00	21.00	17.05		
01984	OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT (Super) • 120 enteric coated softgels	34.00	25.50	23.25	18.00		
01985	OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT (Super) • 60 enteric coated softgels	20.00	15.00	13.50	10.50		
01986	OMEGA 3 EPA/DHA w/SESAME LIGNANS & OLIVE EXTRACT (Super) • 240 small softgels	32.00	24.00	21.00	17.25		
01991	ONCE-DAILY HEALTH BOOSTER • 60 softgels	54.00	40.50	38.00			
02113	ONE-PER-DAY • 60 tablets	22.00	16.50	15.00			
01328	ONLY TRACE MINERALS • 90 veg. caps	15.00	11.25	9.38			
P							
01789	PALMETTOGUARD® SAW PALMETTO w/BETA-SITOSTEROL 30 softgels	15.00	11.25	10.50	9.00		
01790	PALMETTOGUARD® SAW PALMETTO/ NETTLE ROOT w/BETA-SITOSTEROL • 60 softgels	28.00	21.00	19.50	18.00		
*00342	PECTA SOL-C® MODIFIED CITRUS PECTIN •454 grams powder	109.95	93.46				
*01080	PECTA SOL-C® MODIFIED CITRUS PECTIN • 270 veg. caps	79.95	67.96				
01811	PEONY IMMUNE • 60 veg. caps	36.00	27.00	24.00			
*00673	PGX® PLUS MULBERRY (WellBetX®) • 180 veg. caps	34.95	26.21				
01953	POMEGRANATE COMPLETE • 30 softgels	24.00	18.00	15.75			
00956	POMEGRANATE FRUIT EXTRACT • 30 veg. caps	19.50	14.63	13.16			
-01837	POMI-T® • 60 veg. caps	35.00	26.25	24.00			
00577	POTASSIUM IODIDE • 130 mg, 14 tabs	6.95	5.21	3.94			
01500	PQQ CAPS W/BIOPQQ® • 10 mg, 30 veg. caps	24.00	18.00	13.50	12.00		
01647	PQQ CAPS W/BIOPQQ® • 20 mg, 30 veg. caps	40.00	30.00	24.00	21.00		
00302	PREGNENOLONE • 50 mg, 100 caps	26.00	19.50	16.50			
00700	PREGNENOLONE • 100 mg, 100 caps	30.00	22.50	20.25			
*01373	PRELOX® NATURAL SEX FOR MEN® • 60 tablets	52.00	39.00	36.00			
00525	PROBOOST™ THYMIC PROTEIN A • 30 packets	66.60	49.95				
01441	PROGESTA-CARE® • 4 oz cream	36.39	27.29	25.72			
01928	PROSTATE FORMULA (Ultra Natural) • 60 softgels	38.00	28.50	26.25	24.00		
01909	PROSTAPOLLEN™ (Triple strength) • 30 softgels	28.00	21.00	18.75			
01742	PROTEIN-ISOLATE (Whey) Vanilla • 403 grams	30.00	22.50	19.50			
01743	PROTEIN-ISOLATE (Whey) Chocolate • 437 grams	30.00	22.50	19.50			
01770	PROTEIN CONCENTRATE (New Zealand Whey) Vanilla 500 grams	30.00	22.50	19.95			
SUBTOTAL OF COLUMN 8							

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
01771	PROTEIN CONCENTRATE (New Zealand Whey) Chocolate 640 grams	30.00	22.50	19.95			
01812	PROVINAL® PURIFIED OMEGA-7 • 30 softgels	27.00	20.25	18.00			
01676	PS CAPS (Phosphatidylserine) • 100 mg, 100 veg. caps	54.00	40.50	36.00			
01508	PTEROPURE® Pterostilbene • 50 mg, 60 veg. caps	32.00	24.00	22.50			
01209	PUMPKIN SEED EXTRACT (Water-soluble) • 60 veg. caps	20.00	15.00	13.50			
01637	PYCNOGENOL® FRENCH MARITIME PINE BARK EXTRACT 100 mg, 60 veg. caps	64.00	48.00	45.00			
01217	PYRIDOXAL 5'-PHOSPHATE • 100 mg, 60 veg. caps	22.00	16.50	14.85			
Q, R							
01309	QUERCETIN (Optimized) • 250 mg, 60 veg. caps	22.00	16.50	15.00			
01030	RED YEAST RICE (Bluebonnet) • 600 mg, 60 veg. caps	18.08	13.56				
00605	REGIMINT • 60 enteric-coated caps	19.95	14.96	14.00			
01708	REISHI EXTRACT MUSHROOM COMPLEX • 60 veg. caps	30.00	22.50	20.25			
01410	RESVERATROL W/PTEROSTILBENE • 100 mg, 60 veg. caps	36.00	27.00	24.00			
02031	RESVERATROL W/NICOTINAMIDE RIBOSIDE (Optimized) • 30 veg. caps	42.00	31.50	27.00			
02030	RESVERATROL (Optimized) • 60 veg. caps	46.00	34.50	31.00			
00889	RHODIOLA EXTRACT • 250 mg, 60 veg. caps	14.00	10.50	9.00			
01900	RIBOGEN™ FRENCH OAK WOOD EXTRACT 200 mg, 30 veg. caps	36.00	27.00	24.75			
00972	(D) RIBOSE POWDER • 150 grams	27.50	20.63	18.56			
01473	(D) RIBOSE TABLETS • 100 veg. tabs	32.00	24.00	21.00			
01609	RICH REWARDS® BREAKFAST GROUND COFFEE • 12 oz. bag	13.00	9.75				
01730	RICH REWARDS® BREAKFAST BLEND GROUND COFFEE Natural Mocha • 12 oz. bag	15.00	11.25	10.50			
01729	RICH REWARDS® BREAKFAST BLEND GROUND COFFEE Natural Vanilla • 12 oz. bag	15.00	11.25	10.50			
01612	RICH REWARDS® BREAKFAST BLEND WHOLE BEAN COFFEE 12 oz. bag	13.00	9.75				
01610	RICH REWARDS® DECAFFEINATED ROAST GROUND COFFEE 12 oz. bag	14.00	10.50				
01208	R-LIPOIC ACID (Super) • 240 mg, 60 veg. caps	49.00	36.75	33.75			
00070	RNA CAPSULES • 500 mg, 100 caps	17.95	13.46	12.12			
S							
01432	SAFFRON W/SATIEREAL® (Optimized) • 60 veg. caps	36.00	27.00	24.00			
01935	SAMe (S-ADENOSYL-METHIONINE) 200 mg, 30 enteric coated tablets	25.00	18.75	16.50			
01933	SAMe (S-ADENOSYL-METHIONINE) 400 mg, 30 enteric coated tablets	36.00	27.00	24.00			
01934	SAMe (S-ADENOSYL-METHIONINE) 400 mg, 60 enteric coated tablets	66.00	49.50	45.00			
01740	SEA-IODINE™ • 1,000 mcg, 60 veg. caps	8.00	6.00	5.40			
01879	SE-METHYL L-SELENOCYSTEINE • 200 mcg, 90 veg. caps	11.00	8.25	7.50			
00318	SERRAFLAZYME • 100 tablets	18.00	13.50	12.00			
01938	SHADE FACTOR™ • 120 veg. caps	44.00	33.00	30.00			
02110	SHADE FACTOR™ SUNSCREEN LOTION • 4 fl. oz	20.00	15.00	13.00			
02118	SHADE FACTOR™ SUNSCREEN SPRAY • 6 fl. oz	22.00	16.50	14.25			
01884	SILYMARIN • 100 mg, 90 veg. caps	14.00	10.50	9.50			
01249	SINUS CLEANSER • 4 oz. bottle	25.00	18.75				
02129	SKIN CARE COLLECTION ANTI-AGING SERUM • 1.75 fl. oz	60.00	45.00	37.50			
SUBTOTAL OF COLUMN 9							

ITEM No.	PRODUCT	YOUR PRICE				QTY	Total
		Retail Each \$	1 Unit Each	4 Unit Each	10 Unit Each		
02132	SKIN CARE COLLECTION BODY LOTION • 6 oz	28.00	21.00	18.00			
02130	SKIN CARE COLLECTION DAY CREAM • 1.65 fl. oz	50.00	37.50	33.00			
02131	SKIN CARE COLLECTION NIGHT CREAM • 1.65 fl. oz	39.00	29.25	27.00			
01596	SKIN RESTORING PHYTOCERAMIDES w/LIPOWHEAT® 30 liquid veg. caps	25.00	18.75	17.25			
00961	SODZYME® w/GLISODIN® & WOLFBERRY • 90 veg. caps	28.00	21.00	18.00			
00657	SOLARSHIELD® SUNGLASSES • Smoke color	12.99	9.74	8.63			
01097	SOY EXTRACT (ULTRA) • 150 veg. caps	76.00	57.00	50.00			
01649	SOY ISOFLAVONES (SUPER ABSORBABLE) • 60 veg. caps	28.00	21.00	18.75			
00432	STEVIA™ (Better) • 100 packets, 1 gram each	9.95	7.46				
00438	STEVIA™ ORGANIC LIQUID SWEETENER (Better) • 2 oz	11.00	8.25				
01476	STRONTIUM • 750 mg, 90 veg. caps	20.00	15.00	13.50			
01778	SUPER SELENIUM COMPLEX • 200 mcg, 100 veg. caps	14.00	10.50	9.00	8.25		
T							
02023	TART CHERRY W/CHERRYPURE® 60 veg. caps	20.00	15.00	14.00			
01827	TAURINE • 1,000 mg, 90 veg. caps	13.00	9.75	9.00			
01918	TEAR SUPPORT w/MAQUIBRIGHT® • 60 mg, 30 veg. caps	18.00	13.50	12.00			
00133	L-TAURINE POWDER • 300 grams	20.00	15.00	12.66			
*13685	TEN MUSHROOM FORMULA® • 120 veg. caps	39.95	33.96				
01304	THEAFLAVIN STANDARDIZED EXTRACT • 30 veg. caps	18.00	13.50	12.00			
01683	(L) THEANINE • 100 mg, 60 veg. caps	24.00	18.00	15.38			
**01038	THERALAC® PROBIOTICS • 30 caps	47.95	35.96				
00668	THYROID FORMULA (Metabolic Advantage™) • 100 caps	21.95	16.46				
00349	TMG POWDER • 50 grams	14.00	10.50	8.25			
01859	TMG • 500 mg, 60 liquid veg. caps	13.00	9.75	9.00			
01400	TOCOTRIENOLS (Super-absorbable) • 60 softgels	30.00	22.50	21.00			
01278	TOOTH PASTE • 4 oz (Mint) tube	9.50	7.13	6.50			
01917	TRANQUIL TRACT™ • 60 veg. caps	52.00	39.00	34.50			
01468	TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT 60 veg. caps	24.00	18.00	16.50			
01469	TRIPLE ACTION CRUCIFEROUS VEGETABLE EXTRACT w/RESVERATROL • 60 veg. caps	32.00	24.00	22.20			
02003	TRIPLE ACTION THYROID • 60 veg. caps	36.00	27.00	24.00			
01803	TRI SUGAR SHIELD® • 60 veg. caps	36.00	27.00	24.00			
01386	TRUFIBER™ • 180 grams	32.95	24.71				
01389	TRUFLOA® PROBIOTICS • 32 veg. caps	42.95	32.21				
01722	L-TRYPTOPHAN • 500 mg, 90 veg. caps	33.00	24.75	22.50			
01721	TRYPTOPHAN PLUS (Optimized) • 90 veg. caps	32.00	24.00	21.75			
02116	TWO-PER-DAY • 60 tablets	10.50	7.88	7.13			
02115	TWO-PER-DAY • 120 tablets	20.00	15.00	13.50			
02114	TWO-PER-DAY • 120 caps	22.00	16.50	15.00			
00326	L-TYROSINE • 500 mg, 100 tablets	13.50	10.13				
U, V							
01921	URIC ACID CONTROL • 60 veg. caps	24.00	18.00	16.50			
00213	VANADYL SULFATE • 7.5 mg, 100 veg. tablets	15.00	11.25	9.38			
02102	VENOFLOW™ • 30 veg. caps	52.00	39.00	36.00			
00408	VENOTONE • 60 caps	18.95	14.21	12.00			
SUBTOTAL OF COLUMN 10							

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
01327	VINPOCETINE • 10 mg, 100 veg. tablets	18.00	13.50	10.50			
00372	VITAMIN B3 NIACIN • 500 mg, 100 caps	7.65	5.74	4.99			
02028	VITAMIN B5 • 500 mg, 100 veg. caps (Pantothenic Acid)	11.00	8.25	7.50			
01535	VITAMIN B6 • 250 mg, 100 veg. caps	12.50	9.38	8.25			
00361	VITAMIN B12 • 500 mcg, 100 lozenges	8.75	6.56	5.44			
01634	VITAMIN C w/DIHYDROQUERCETIN 1,000 mg, 60 veg. tablets	10.00	7.50	6.75			
00927	VITAMIN C w/DIHYDROQUERCETIN 1,000 mg, 250 veg. tablets	27.00	20.25	18.00			
00084	VITAMIN C POWDER (BUFFERED) • 454 grams	23.95	17.96	16.50			
01736	VITAMIN C-MAGNESIUM CRYSTALS (EFFERVESCENT) 180 grams	20.00	15.00	13.50			
01732	VITAMIN D3 • 2,000 IU, 1 fl. oz, Mint flavor	28.00	21.00	18.75			
01753	VITAMIN D3 • 1,000 IU, 90 softgels	7.00	5.25	4.50			
01751	VITAMIN D3 • 1,000 IU, 250 softgels	12.50	9.38	8.44			
01713	VITAMIN D3 • 5,000 IU, 60 softgels	10.00	7.50	6.50			
01718	VITAMIN D3 • 7,000 IU, 60 softgels	14.00	10.50	9.45			
01758	VITAMIN D3 W/SEA-IODINE™ • 5,000 IU, 60 caps	14.00	10.50	9.38			
00864	VITAMIN D3 LIQUID • 2,000 IU, 1 fl. oz	28.00	21.00	18.75			
01840	VITAMINS D AND K W/SEA-IODINE™ • 60 caps	24.00	18.00	16.50			
01863	VITAMIN E (Natural) • 400 IU, 90 softgels	28.00	21.00	19.50	18.00		
01936	VITAMIN K2 (Low dose) • 45 mcg, 90 softgels	18.00	13.50	12.00			
W							
01902	WAIST-LINE CONTROL™ • 120 veg. caps	42.00	31.50	28.50			
X, Y							
01919	X-R SHIELD • 90 veg. caps	15.00	11.25	9.75			
00409	XYLIWHITE™ MOUTHWASH • 16 oz	10.00	7.50				
Z							
01813	ZINC HIGH POTENCY • 50 mg, 90 veg. caps	7.95	5.96	5.25			
01561	ZINC LOZENGES • 60 veg. lozenges	9.00	6.75	6.00			
01961	ZINC LOZENGES (Enhanced) • 30 veg. lozenges	12.00	9.00	6.00			
*01051	ZYFLAMEND® WHOLE BODY • 120 liquid veg. caps	72.95	54.71				
BOOKS							
33998	THE RIGHT TO TRY by Darcy Olsen • 2016	26.99	20.24				
33890	FORTIFY YOUR LIFE by Tieraona Low Dog, MD • 2016	28.89	21.67				
33885	THE BLUE ZONES SOLUTION by Dan Buettner • 2015	26.00	19.50				
33880	OUTSTANDING HEALTH: THE 6 ESSENTIAL KEYS TO MAXIMIZE YOUR ENERGY AND WELL BEING by Michael Galitzer, MD & Larry Trivieri Jr. • 2015	24.95	18.71				
33877	THE TRUTH ABOUT MEN AND SEX by Abraham Morgentaler, MD, FACS • 2015	16.99	12.74				
33875	DOCTORED: THE DISILLUSIONMENT OF AN AMERICAN PHYSICIAN • by Sandeep Jauhar • 2015	26.00	19.50				
33874	MISSING MICROBES • by Martin J. Blaser, MD • 2014	28.00	21.00				
33873	EATING ON THE WILD SIDE • by Jo Robinson • 2014	16.00	12.00				
33867	THE COMPLETE MEDITERRANEAN DIET by Michael Ozner, MD • 2014	19.95	14.96				
SUBTOTAL OF COLUMN 11							

ITEM No.	PRODUCT	Retail Each \$	YOUR PRICE			QTY	Total
			1 Unit Each	4 Unit Each	10 Unit Each		
33870	MAGNIFICENT MAGNESIUM by Dennis Goodman, MD • 2014	14.95	11.21				
DPT05	DISEASE PREVENTION AND TREATMENT, EXPANDED FIFTH EDITION (Hardcover) • 2014	69.95	39.95	36.00			
33865	THE RESTORATION OF THE HUMAN BODY [IN 7 PARTS] by Sergey A. Dzigan, MD, PhD • 2014	29.95	22.46				
33862	I'M TOO YOUNG FOR THIS • by Suzanne Somers • 2013	26.00	19.50				
33835	PHARMOCRACY • by William Faloon • 2011	24.00	9.60	8.00			
33958	THE VITAMIN D SOLUTION by Michael F. Holick, PhD, MD (Paperback) • 2013	16.00	12.00				
33838	YOUR GUIDE TO HEALTHY SKIN THE NATURAL WAY by Gary Goldfaden, MD • 2012	26.00	15.00				
33815	KNOCKOUT • by Suzanne Somers • 2009	25.99	17.00				
33696	LIFE EXTENSION REVOLUTION by Philip Lee Miller, MD (Paperback)	16.00	12.00				
SUBTOTAL OF COLUMN 12							

- * These products are not 25% off retail price.
- ** Due to license restrictions, this product is not for sale to customers outside of the USA.
- *** Due to license restrictions, this product is not for sale to Canada.
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SUBTOTAL COLUMN 2

SUBTOTAL COLUMN 3

SUBTOTAL COLUMN 4

SUBTOTAL COLUMN 5

SUBTOTAL COLUMN 6

SUBTOTAL COLUMN 7

SUBTOTAL COLUMN 8

SUBTOTAL COLUMN 9

SUBTOTAL COLUMN 10

SUBTOTAL COLUMN 11

SUBTOTAL COLUMN 12

ORDER TOTALS

SUBTOTAL OF COLUMNS 1 - 12

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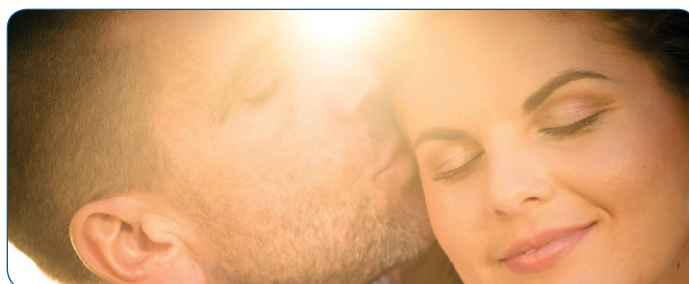
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LifeExtension® Magazine



28 NUTRIENTS FOR YOUR SKIN

Skin rejuvenation is transforming into evidence-based reality. Researchers have created a *nutrient-rich* topical program designed to promote renewal of aged skin.



40 REVERSE ERECTILE DYSFUNCTION

Clinical studies reveal specific **nutrients** that can help reverse **endothelial dysfunction** and improve male **sexual performance**.



52 OVERLOOKED CAUSE OF STROKE AND DEMENTIA

Rising **homocysteine** levels *increase* risk for heart attack and dementia. A simple **blood test** can determine homocysteine levels that can be *safely* lowered with the proper forms of **B-vitamins**.



64 TARGETED BLOOD-SUGAR CONTROL

The **US Department of Agriculture** has filed a patent application on a *water-soluble* **cinnamon** extract based on its **glucose-lowering** properties.