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**Two-Per-Day Tablets**
Item #02315 • 120 tablets (2-month supply)

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AS WE SEE IT: TRAGEDY OF DELAYED PREVENTION
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A confluence of scientific findings is enabling the Age-Reversal Network to formalize a clinical trial concept whereby the regenerative effects of a series of protocols will be evaluated over an extended period.

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Long-term use of proton pump inhibitors, drugs like Prilosec OTC®, is associated with a doubling of liver cancer risk, according to a new study. Safer alternatives to protect the stomach from acid damage should be considered.

ON THE COVER
MAXIMIZE GREEN TEA BENEFITS
Published studies show that drinking large amounts of green tea reduces the risk of degenerative disorders. A novel extract provides 8 different catechins—the equivalent of up to 12 cups of standard green tea.

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We at Life Extension® interact with new supporters who come to us with serious disorders, such as failing kidneys.

A record number of Americans now require dialysis treatments to remove waste products from their blood. Dialysis is not nearly as efficient as healthy kidneys that work around the clock.\(^1\)\(^2\)

To put this into perspective, the five-year survival rate for patients who start dialysis was only 36% compared to 86% for those who received a kidney transplant.\(^3\) Neither scenario comes close to having healthy kidneys.

Type II diabetes is a risk factor for kidney disease. Around 10%-40% of type II diabetics will experience kidney failure.\(^4\) Research shows that before diabetes is diagnosed, higher-than-normal blood sugar levels damage kidneys.\(^5\)

A significant part of the American population (about 27%) has blood sugar levels that are higher-than-normal—but not high enough to meet the threshold for type II diabetes.\(^6\)

This “prediabetic” phase places people at risk for kidney disease,\(^5,7\) potentially crippling neuropathy,\(^8,9\) heart disorders,\(^10,11\) cancer,\(^12,13\) and stroke.\(^14\)

Our longstanding position is that the term “prediabetes” should be abolished. Anyone with less-than-optimal glucose, insulin and hemoglobin A1c (HbA1c) blood levels should aggressively intervene to reverse these glycemic markers.

Instead of this logical approach, what usually happens is that elevated glucose and insulin smolder for years.

In many of these cases, type II diabetes is not diagnosed until permanent damage is inflicted.

Drugs to treat type II diabetes are frequently advertised. Too bad TV commercials don’t promote comprehensive blood tests to identify diabetic risk factors before they cripple or kill.

The tragedy for most victims of degenerative illness is that their disease was preventable with early-diagnosis.

This editorial will review recent findings indicating that many Americans needlessly suffer diabetic complications. I will also describe an easy way to detect diabetes risk at an earlier stage, before significant damage is done.
Most readers of this magazine take steps to reduce their risk of diabetes, such as supplementing with vitamin D.

In people with higher vitamin D blood levels (>50 ng/mL), transition from prediabetes to type II diabetes may be reduced as much as 80%.

But as I wrote on the previous page, we at Life Extension® advocate for the term “prediabetes” to be abolished. Our rationale is that the risk of diabetic complications is substantially increased even in those with high-normal blood glucose levels.

Nerve Damage Starts Early

Small, capillary-like blood vessels that are embedded in nerve bundles feed the nerves throughout our bodies, including small and large nerves in our feet.

An elevation of glycemic markers means that excessive blood sugar and glycation are inflicting damage to small nerve fibers by cutting off blood circulation. This is the reason why crippling neuropathic pain is often the first sign of type II diabetes. This nerve damage may have begun decades before.

A 2018 study looked at hemoglobin A1c levels in groups of people with and without diabetes. Hemoglobin A1c is a marker of long-term sugar control, whereas fasting glucose only tells us what blood sugar levels are, at a single point in time.

This study found subclinical, small nerve-fiber impairments in non-diabetics whose hemoglobin A1c levels were only 5.5% to 6%, whereas those with HbA1c of less than 5.5% did not have these changes.

This study corroborates what we’ve argued for decades — that sugar-related pathologies begin long before full-blown type II diabetes is diagnosed. The authors of this study concluded:

“These findings underscore the importance of early treatment at the prediabetes and early diabetes stages to prevent nerve fiber decline that is likely irreversible.”

Most of you have your hemoglobin A1c tested each year. This 2018 study and others validate the importance of targeting HbA1c below 5.5%.

Keep Your Heart From “Shrinking”

To evaluate the effect of abnormal blood sugar levels on the heart muscle, MRI scans were performed on the hearts of diabetics and prediabetics and compared to a control group of normal-glycemic subjects. None of the study subjects had a history of cardiovascular disease.

There was a stepwise decrease in right ventricular (heart) volume in men with prediabetes (-20.4) and diabetes (-25.6) in comparison with non-diabetic controls.

This study shows that atrophy (shrinkage) of the heart muscle occurs in both prediabetes and frank diabetes, which is why we want the term “prediabetes” to be abolished.

The authors of this 2018 study that looked at the heart via MRI imaging concluded:

“This study points towards early subclinical changes in right ventricular volumes in men with diabetes and prediabetes.”
AS WE SEE IT

Higher Blood Sugar Increases Atrial Fibrillation Risk

In atrial fibrillation, the heart’s upper chambers beat irregularly (quiver) instead of beating normally. Quivering of the heart’s upper chambers increases the risk of a clot forming. When these clots break off and enter the bloodstream, they readily lodge in arteries in the brain causing an ischemic stroke.

Atrial fibrillation causes about 15% to 25% of strokes. The danger of these clots is so high that atrial fibrillation patients are usually placed on anticoagulant drugs (warfarin or Pradaxa). These drugs carry the side effect of risk of internal bleeding. Yet the incidence of abnormal blood clot formation is so high in atrial fibrillation that the risk-to-reward ratio often favors use of these anti-coagulant drugs.

Atrial fibrillation is the most prevalent cardiac rhythm disorder in the elderly. A meta-analysis of 32 studies found that prediabetics have a 20% increased risk of atrial fibrillation while diabetics have a 28% increased risk.

Stroke was long ago shown to be a diabetic complication. One pathological factor is damage inflicted on the brain’s arteries by elevated blood sugar. This new data reveals another reason why diabetics suffer more strokes. They have higher incidences of atrial fibrillation. This analysis also reveals that atrial fibrillation risk in prediabetics is not that much lower than in full-blown diabetics.

Impaired Cardiac Fitness

Not all overweight people are diabetic.

A group of researchers examined relationships between glycemic control (as measured by hemoglobin A1c) and cardiovascular fitness in overweight/obese subjects with and without type II diabetes.

A statistically significant relationship was observed between lower hemoglobin A1c and better cardiovascular fitness.

The authors of this published study commented that even a mild worsening of glycemic control can adversely influence cardiovascular health measures.

Recognizing “Prediabetic” Risks

About 86 million people in the United States fit the clinical definition for prediabetes. This represents about 27% of the entire population of the United States. Prevalence of prediabetes increased each year between 2011 and 2014, which contributed to the nearly 2 million new diagnoses of type II diabetes made each year.

A detailed analysis published in 2018 found that type II diabetics had higher adjusted odds of suffering cardiovascular and kidney diseases compared to prediabetes.

Prediabetes, on the other hand had more of the following disorders compared to diagnosed type II diabetics:

- Cancer
- Arthritis
- Depressive disorder
- Chronic obstructive pulmonary disease

One reason prediabetics have higher rates of the above diseases is that most type II diabetics are treated with a drug (metformin) that increases cellular AMPK activity. Activating AMPK has been shown to help protect against a host of degenerative diseases.
Prediabetes and Hypertension

High blood pressure and high blood sugar severely impact the heart and kidneys. A study published in 2018 looked at hypertensive patients with and without prediabetes. The following “cardiovascular events” were evaluated:10

- Cardiovascular death
- Stroke
- Heart failure
- Myocardial infarction

The incidences of these cardiovascular events were 61% higher in the prediabetic group compared to those with normal blood glucose levels.10

This study also found a correlation between kidney impairment and increased cardiovascular events. This finding corroborates similar conclusions from previous studies.10

Hemoglobin A1c Blood Level and Stroke Risk

A systematic review of 29 prior studies assessed the association between rising hemoglobin A1c and first stroke risk.22

In this review, the risk of ischemic strokes—the most common type—increased with each 1% increase in HbA1c. In diabetics the risk of ischemic stroke increased 24% with each 1% increase in HbA1c. But in those without diabetes, stroke risk increased a whopping 49% for each 1% increase in HbA1c.22

You may wonder why stroke risk is higher in non-diabetics. My opinion is that it’s because diabetics usually receive preventive treatment for stroke risk factors (such as elevated blood pressure and lipids), adhere to healthier diets, and are prescribed AMPK activator drugs like metformin. Non-diabetics may not take their elevated glycemic markers seriously.

Diabetes Increases Cancer Risk

Data collected from 47 prior studies further confirm that diabetes heightens the risk for cancer.

The overall findings showed that women with diabetes are 27% more likely to develop cancer while diabetic men are at 19% increased risk.27

Higher blood sugar levels have been associated with elevated cancer risks, including pancreatic and breast malignancies.28,29

Long before type II diabetes is diagnosed, huge amounts of insulin are produced to suppress surging blood glucose levels. The combination of elevated insulin and glucose in diabetics fuels unwanted cell proliferation and damages cell regulatory mechanisms.

The result is an increased risk of deadly cancers. Authors of this 2018 analysis concluded:

“We have also demonstrated for the first time that women with diabetes are more likely to develop any form of cancer (than men), and have a significantly higher chance of developing kidney, oral, and stomach cancers and leukemia.”30

We have previously reported on studies showing that higher-than-normal blood sugar sharply increases breast cancer risk in non-diabetic women.31,32

Keeping your glycemic markers in low normal ranges should be part of a cancer prevention strategy.
This study showed that a small increase in HbA1c blood levels is associated with increased first-ever ischemic or hemorrhagic stroke risk, whether or not one is diagnosed with diabetes. This led the authors of this 2018 analysis to conclude:

“These findings suggest that more intensive HbA1c glycemic control targets may be required for optimal ischemic stroke prevention.”

Optimal HbA1c is under 5.5%. When HbA1c levels rise to 6.5%, there is a substantially greater risk of stroke. This observational analysis suggests non-diabetics (in addition to diabetics) benefit from better glycemic control.

**Tragedy of Delayed Prevention**

Each day, 5,000 Americans perish from a degenerative illness. Far more suffer from a chronic disease that impairs their quality of life.

The majority of these disabilities and deaths are preventable with annual comprehensive blood tests.

The absurdity is that many Americans wait for a diabetic complication to manifest (such as neuropathy, stroke, or kidney failure) before paying attention to their glycemic risk markers.

Several times a week, I review new data confirming that even slightly elevated blood glucose or hemoglobin A1c predisposes us to increased risks faced by diabetics.

The good news is that these risk factors can be lowered using a variety of proven interventions.

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**Annual Blood Test Super Sale**

With normal aging, our cellular insulin sensitivity decreases. The result is higher blood sugar that can be measured with readily available blood tests.

Comprehensive blood tests uncover early markers of disease that are reversible if detected in time.

Yet the inconvenience of doctors’ appointments (and increasing cost) causes many people to delay having their blood tested.

Life Extension® broke down these barriers decades ago by offering comprehensive blood testing direct to our supporters.

Once a year we **discount** prices to enable our readers to have comprehensive testing done for only $199. These same tests at commercial labs cost far more.

With thousands of blood-drawing stations available across most of the United States, either on a walk-in basis or by appointment, there is no need to delay.

These tests provide evaluations for cardiovascular and cancer risk factors. This enables individuals to change their unhealthy behavior patterns before serious illness manifests.

Turn this page to see the descriptions of the many tests that are included in our **Male and Female Blood Test Panels**. These panels include hemoglobin A1c, glucose, and measures of kidney function.

This year we’ve added fasting insulin to these popular panels to better enable our readers to achieve optimal glycemic control. See the box on the next page to learn why it is so important to know your fasting insulin level when seeking to protect against hidden pathologies caused by excessive blood sugar.

To order the **Male or Female Panel** at the year’s lowest prices, call 1-800-208-3444 or log on to LifeExtension.com/blood.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club
How Diabetes Hides from Physicians

Young people who eat properly and are physically active typically maintain optimal glycemic control.

When a meal is consumed, their pancreas secretes 
**insulin** to move 
**glucose** into cells for energy metabolism. After meals, insulin production drops to a low level, just enough to keep blood glucose in proper balance.

With aging, our cells lose 
**insulin sensitivity**. This requires more insulin to be secreted to drive glucose into cells, including 
**fat cells**.³⁴,³⁶

Increased 
**fat storage** occurs when the body is over-tested with more glucose than is needed for healthy energy production. Excess insulin helps cells convert glucose into fat. Unwanted 
**weight gain** is a frequent consequence.

As people become more sedentary and consume excess calories, even more insulin is secreted to maintain balanced glucose levels.

**Excess Insulin Can Cover Up Glycemic Control Problems**

Long before type II diabetes is diagnosed, many people secrete large amounts of **insulin** from their pancreas to keep glucose from spiking too high.

The problem is that continuous secretion of **insulin** from the pancreas can keep 
**fasting glucose** and 
**hemoglobin A1c** at deceptively low levels.

To put this in perspective, late-stage **type II diabetics** often require 
**insulin injections**. This exogenous-administered insulin reduces 
**glucose** and 
**hemoglobin A1c** blood levels. But these people are still **diabetic** from the standpoint of their risk for complications.

Common blood measures of diabetes (**glucose** and 
**hemoglobin A1c**) may also be suppressed in many people whose pancreas are secreting 
**large** amounts of 
**insulin** around the clock.

In other words, a person can suffer from the damaging pathologies that we usually associate with diabetes even when 
**glucose** and 
**HbA1c** blood levels appear normal. That’s because chronically 
**elevated insulin** can push down glucose (and hemoglobin A1c) for years (or decades) before cellular insulin sensitivity becomes so impaired that full-blown **type II diabetes** is diagnosed.

Chronically elevated 
**fasting insulin** has been associated in many studies with greater risk of diabetic complications, even before diabetes shows up on conventional blood tests.³⁷-⁴⁰

For these reasons, we are adding a 
**fasting insulin** test to this year’s popular **Male** and **Female Panels… at no extra charge!**

This will better enable our supporters to assess their glycemic control status by reviewing their 
**glucose**, 
**hemoglobin A1c** and 
**insulin** blood levels simultaneously.

**How to Lower Elevated Insulin**

If 
**fasting insulin** is higher than 5 uIU/mL, this is an indicator of insulin resistance and can be useful as an early warning sign to be more vigilant in preventing diabetes.

This includes healthier food choices, more physical activity, and initiation of a preventive program with 
**AMPK activators** like the drug 
**metformin** and/or nutrients that have similar effects (like gynostemma leaf extract and hesperidin).

The article beginning on page 56 of this month’s issue describes health concerns, including inability to lose surplus 
**body fat** that are associated with excess 
**fasting insulin**. We also convey observational data that associate higher 
**fasting insulin** levels with increased prevalence of degenerative disorders. *(References can be found on page 14.)*

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Excess insulin and insulin resistance cause deleterious changes in many biochemical pathways that can lead to the development of a number of degenerative diseases and potentially life-threatening metabolic consequences."
The value of the Male and Female Blood Panels improves as more tests are added at no additional cost. Last year, apolipoprotein B was added to better measure vascular risk. This year, fasting insulin has been added to provide a clearer picture of one’s metabolic status. If elevated, steps to reduce fasting insulin can help assist with weight loss and achieving better glucose control.

See the huge number of parameters included in these test panels:

**MALE PANEL**

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

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

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

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

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

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

**FEMALE PANEL**

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

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

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

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

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

**Lab Test Super Sale • March 25 – June 3, 2019.**

Retail price: $400 • Your Price: $199

To obtain these comprehensive Male or Female Panels at these low prices, call 1-800-208-3444 or log on to www.LifeExtension.com/blood to order your requisition forms.

Then—at your convenience—when you have the form, you can visit one of the blood-drawing facilities provided by LabCorp in your area or at the Life Extension Nutrition Center in Ft. Lauderdale.

Blood testing services are available only in the continental United States and Anchorage, AK. Not available in Maryland. Restrictions apply for residents of MA, NY, NJ, RI, and PA.
59. Goldstein BJ. Insulin resistance as the core defect in type 2 diabetes mellitus. Am J Cardiol. 2002 Sep 5;90(5A):3G-10G.
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Eye Pressure Support with Mirtogenol®
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Inflammation in Midlife Linked to Steeper Cognitive Decline in Later Life

Middle-aged people with higher levels of chronic inflammation experience greater cognitive decline for the next two decades, according to a study published in the journal Neurology. *

For 20 years, researchers followed 12,336 participants, whose average age was 57 at the start. These men and women were part of the ongoing study called Atherosclerosis Risk in Communities (ARIC). The individuals’ inflammation composite score, using 4 blood biomarkers, was measured at the beginning. Another measurement of inflammation, C-reactive protein (CRP), was taken later. Each person’s cognitive ability was also assessed at the start of the study, 6 to 9 years later, and at the end.

Researchers determined cognition scores by measuring memory, executive function and language, at three different times over the course of the study. They adjusted for a wide range of variables, including educational attainment, demographic factors, and the presence of disease.

What they found was that people with the highest inflammation scores had a 7.8% steeper decline in cognitive ability than those with the lowest scores. Additionally, participants with the highest CRP levels showed cognitive decline at a rate that was 11.6% higher than for those with the lowest levels, notably in the area of memory.

Editor’s Note: “Our findings highlight what may be an early pathogenic role for systemic inflammation as a driver of cognitive decline in the decades leading up to older adulthood,” the authors concluded.

Metformin and Quercetin Work Better Together Against Prostate Cancer Cells

A study published in the journal *Gene* found that a combination of metformin and quercetin can have synergistic effects in the treatment of prostate cancer.*

The scientists first observed this effect in cell culture, and then confirmed it in an animal model where the combination treatment helped block the growth of implanted prostate cancer cells in mice.

Metformin, a well-known diabetes medication for reducing blood sugar, has recently been studied for its anti-cancer effects, because researchers discovered lower rates of cancer in diabetic patients who took it.

Quercetin, a natural compound, is present in many fruits and vegetables, and it has also been found to have anti-tumor effects.

The results of this study demonstrate that the 2 compounds work together to reduce the growth of prostate cancer, inducing death in the cancer cells and preventing their spread. This effect was more powerful when the 2 compounds were combined, compared to administering either one singly.

**Editor's Note:** The combination of metformin and quercetin may prove to be a useful tool in the management of human prostate cancer, one of the most common forms of cancer in men, the researchers concluded.

When You Eat May be as Important as What You Eat

A study supported by the American Heart Association found that people who consumed 30% or more of their calories for the day after 6 p.m. were at an increased risk for disease.* This was the case even when eating at night was not associated with obesity.

Data were analyzed from 12,708 participants 18 to 76 years old, in the Hispanic Community Health Study/Study of Latinos. The subjects consumed, on average, 35.7% of their daily calories after 6 p.m.

The researchers observed an increase in risk factors for diabetes, including higher fasting glucose, insulin, and insulin resistance in association with each 1% increase in the number of daily calories consumed later than 6 p.m., which is about 20 calories in a 2,000-calorie-a-day diet. Among the 56.6% of participants who consumed more than 30% of their calories after 6 p.m., there was a 23% higher risk of developing hypertension and a 19% greater risk of becoming prediabetic, in comparison with the risks experienced by those who consumed less than 30% of their daily intake after 6 p.m.

Editor’s Note: “There is increasing evidence that when we eat is important, in addition to what we eat and how much we eat,” said lead author Nour Makarem, PhD. “In our study we show that if you eat most of your calories before 6 p.m., you may have better cardiovascular health. Your meal timing matters and eating earlier in the day may be an important strategy to help lower the risk for heart disease.”

**Sedentary Lifestyle Can Raise Risk for Kidney and Bladder Cancer**

A lifetime of physical inactivity has been shown to increase the risk for kidney and bladder cancer, even when obesity is not a factor, according to a study published in the journal *Cancer Epidemiology*. *

After identifying 160 patients diagnosed with renal (kidney) cancer and 208 patients with bladder cancer, researchers compared them to 766 age-matched control subjects who did not have cancer.

Study subjects were then asked in detail about their physical activity. In particular, the researchers wanted to identify those individuals who reported that they had not participated in any regular physical activity throughout their lifetimes.

The findings showed that a sedentary lifestyle, lacking in regular physical exertion, was significantly associated with more than 1.7 times greater risk for both of these forms of cancer. Furthermore, even when removing subjects who were obese from the analysis, absence of physical activity was still an independent predictor of cancer risk.

*Editor’s Note:* For decades, physicians have recognized sedentary lifestyle as a major risk factor for metabolic disease, obesity, and cardiovascular disease. However, increasing evidence is linking lack of physical activity to risk for other chronic diseases, including various forms of cancer. It appears that this increased risk is not tied only to obesity, as even sedentary individuals with normal weight were at higher risk for renal and bladder cancer.

Lactoferrin Can Help Ease Loss of Taste, Smell, after Chemotherapy

A frequent side effect for chemotherapy patients, abnormalities in taste and smell, can be improved by supplementing with lactoferrin (a protein that occurs in milk and saliva) the journal Food & Function reported. * A study found that lactoferrin could help reduce chemotherapy-related loss of taste and smell, which can have an impact on patients’ food intake.

Twelve healthy participants and 19 cancer patients with chemotherapy-related taste and smell abnormalities were given 3 lactoferrin tablets of 250 mg each, per day, for 30 days. Saliva samples were analyzed for proteins and minerals at the beginning of the treatment period, at 30 days, and then 30 days after the end of treatment.

A significant level of abnormalities in taste and smell was associated with a loss of salivary immune proteins and high salivary iron, and these changes were modified following supplementation with lactoferrin. “Our research shows that daily lactoferrin supplementation elicits changes in the salivary protein profiles in cancer patients—changes that may be influential in helping to protect taste buds and odor perception,” researcher Susan Duncan said.

Editor’s Note: “This study demonstrated the feasibility of developing lactoferrin supplementation as a treatment to reduce taste and smell abnormalities caused by chemotherapy, and improve patients’ oral immunity,” the researchers asserted.

* Food Funct. 2018 Sep 19;9(9):4948-4958.
For full product description and to order Gummy Science Youthful Collagen, call 1-800-544-4440 or visit www.LifeExtension.com

Oral ingestion of collagen peptides and hyaluronic acid boosts these rejuvenating factors in normal, aging skin.

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MacuGuard® Ocular Support provides lutein, trans-zeaxanthin, and meso-zeaxanthin to help maintain structural integrity of the macula and retina.1,5

Alpha-carotene is included based on new evidence that it helps support the macular pigment.1

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

This formula provides the optimal dose of saffron along with cyanidin-3-glucoside to support healthy vision.5,6

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References
MAXIMIZE
GREEN TEA’S
Health Benefits
Validation of the whole-body benefits of green tea continues to grow.\textsuperscript{1-6}

A human study published in \textit{The Journal of the American Medical Association} found that consuming 5 or more cups of green tea daily was associated with a 26\% lower risk of cardiovascular death.\textsuperscript{1}

A meta-analysis found that for every 500 ml-per-day increase in green tea consumption (about 3 cups), the risk of cognitive disorders decreased 29\%.\textsuperscript{2}

The most impressive published data shows meaningful reductions in risks of certain cancers in those who consume the most green tea.

Published studies largely focus on a compound found in green tea leaves called epigallocatechin gallate (EGCG).

Several other compounds in green tea have also demonstrated health benefits.\textsuperscript{7-14} For many people, obtaining these other compounds has been difficult.

Using a patented technique,\textsuperscript{15} a new highly absorbable extract provides 8 different green tea catechins.

This novel extract enables people to easily obtain the catechin content equivalent of drinking up to 12 cups of standard green tea.
In 1992, Life Extension® published an article describing significant health benefits in people who consumed large quantities of green tea beverages. While drinking green tea throughout the day is popular in Japan, it was challenging for people in Western cultures to adapt to this practice.

One reason large amounts of tea need to be consumed are absorption issues. It requires a lot of tea to boost blood levels of disease-fighting green tea polyphenols.

This led to massive research efforts to develop extracts from green tea leaves. This research yielded concentrated powders of active polyphenols that were more absorbable than green tea beverages.

Unlike FDA-regulated prescription drugs, free-market forces drove down the price of standardized green tea extracts to where they became one of the better values on the dietary supplement marketplace.

Relentless research has advanced this absorption technology to a new level. Health conscious consumers can now benefit from higher potencies of a broader spectrum of green tea polyphenols.

What Are Catechins?

Green tea comes from leaves that have not yet oxidized to become black tea. These leaves contain a rich mixture of polyphenols called catechins (pronounced cat-eh-kins).

The most abundant catechin in green tea is epigallocatechin gallate (EGCG), accounting for as much as 65% of all green tea catechins.17

Thousands of published studies describe the benefits of epigallocatechin gallate (EGCG). Scientists have identified other green tea catechins that also contribute to its long list of health benefits. These additional catechins are:7-14

- Catechin
- Catechin gallate
- Epicatechin
- Epicatechin gallate
- Epigallocatechin
- Gallocatechin
- Gallocatechin gallate

In animal and human studies, greater green tea consumption and increased catechin intake are correlated with improvements in health and reduced disease risks, including:

- Reduced cancer incidence,
- Reduced incidence of heart attack, stroke, and metabolic disease,
- Protection of brain function, and more.2,17-27

New Green Tea Extract

To provide a broader range of beneficial catechins, scientists have developed a novel green tea extract that delivers 8 different catechins that can be efficiently absorbed by the body.15

The process starts with non-genetically modified (non-GMO) tea plants grown in a pristine, remote, mountain environment in South Africa.

Within just 6 hours of harvest, the fresh, live tea is processed at the same location by a patented extraction process which “unlocks” 8 catechins naturally found in tea, making them more available for optimal absorption in the body.

The catechins are then formulated into plant-derived liposomes, tiny spherical structures that can easily pass through cell membranes, allowing greater absorption directly by the cells in the body. That means an individual can now obtain and absorb a greater amount of green tea’s benefits from a smaller amount of tea.

By using these special techniques, the green tea extract can stay in the body for up to 24 hours, allowing for greater absorption of all 8 green tea catechins.16
Reduced Risk of Cardiovascular Disease

Green tea consumption correlates with reductions in risk factors for several major cardiovascular diseases. Among its benefits:\(^3,^4,^{19,28}\)

- **Lower blood pressure.** Among adults without hypertension, tea drinkers have a lower risk of developing it—46% lower for people who regularly drink 1-5 cups per day and 65% lower for those drinking more than 5 cups per day.\(^4\) In individuals with existing hypertension, systolic blood pressure was reduced by 6.4% after 12 weeks of drinking a beverage with green tea extract containing a mixture of catechins.\(^3\)

- **Improvement in cholesterol levels.** LDL (or “bad”) cholesterol levels were reduced in green tea drinkers.\(^3,^{19,28,29}\) In a 2018 study, obese and overweight women who received a green tea extract rich in multiple catechins for 6 weeks experienced an average (modest) 4.8% decrease in LDL cholesterol levels.\(^29\)

- **Reduction in body fat and obesity.** Individuals who, on a daily basis for 12 weeks, consumed a beverage with a green tea extract, containing a mixture of catechins, had a 10.3% and 9.4% reduction, respectively, in total body-fat mass and visceral-area fat. Waist circumference was also reduced by 1 inch.\(^3\)

Green tea also supports blood vessel health and maintains healthy blood flow. It does this by:\(^19\)

- Preventing vascular inflammation, which can contribute to development of atherosclerosis, a harmful buildup of plaque in the arteries,

- Inhibiting the abnormal proliferation of smooth muscle cells, also associated with hardening of the arteries and progression of atherosclerosis,

- Reducing dysfunction in the endothelial cells (which line the interior surface of blood vessels), helping to maintain healthy arterial malleability and blood pressure, and

- Reducing adhesion of platelets to blood vessel walls, suggesting that it may prevent dangerous clots that block blood flow and can cause stroke and/or heart attack.

The net effect of these benefits is that green tea intake is strongly associated with reduced risk of cardiovascular disease and death.
A large, prospective study of human subjects, followed long-term, was published in *The Journal of the American Medical Association (JAMA)*. In more than 40,000 individuals, those who consumed more than 5 cups of green tea daily benefited from as much as 26% lower risk of death from cardiovascular causes compared to people who drank less than one cup daily.

**Anti-Cancer Effects**

Researchers for many years have focused on green tea’s unique, multiple anti-cancer benefits.

The catechins in green tea have shown an ability to fight cancer in multiple ways.

In addition to powerful free-radical scavenging and anti-inflammatory effects, which help protect cells from harmful mutations that can lead to cancer, several green tea catechins demonstrate a wide range of other benefits, including:

- **Killing cancer cells.** Green tea catechins trigger programmed cell death (*apoptosis*) in cancer cells, but not in healthy cells.

- **Stopping cancer growth.** The progression of cancer is often aided by various growth factors and the pathways they activate in the growing tumor. Green tea catechins have been found to block several of these signaling pathways and their effects.

- **Keeping tumors from getting nutrients.** For tumors to grow, they require new blood vessel growth to supply nutrients. Catechins from green tea block the formation of new tumor blood vessels and starve the tumor cells of the nutrients they require.

- **Blocking cancer activation.** Cellular stress can promote tumor growth by activating the pro-inflammatory signaling pathway *NF-kB* (nuclear factor-kappaB). Studies have shown that suppressing NF-kB activation can help lower pro-cancer signaling. Experiments have shown that green tea can reduce tissue inflammation and retard the progression of cancer cells.

Animal and cell studies have shown that green tea is associated with protection from various forms of cancer, including some of the most common, such as breast, prostate, lung, colon, and skin cancer.

**Slightly Improved Blood Sugar Control**

Chronically elevated blood glucose levels can progress into diabetes and can be a factor in a myriad of degenerative diseases. Over time, it causes damage to almost all tissues in the body, greatly accelerating aging and increasing the risks for many age-related diseases.
Dietary changes and weight loss are often recommended to improve control of glucose levels. The catechins in green tea can also aid the body in processing glucose and preventing the harmful effects of elevated glucose.

A group of researchers performed a pooled analysis of 17 randomized human trials of green tea extract (using both beverage and capsules) for glucose control.21 Overall, these studies found that intake of green tea extract modestly reduced glucose levels (on average by almost 2 mg/dL).

Green tea extract was found to lower values of hemoglobin A1c (HbA1c), a measure of long-term glucose control. Higher levels of HbA1c result in greater incidences of diabetic complications. HbA1c is often used to track progress in the treatment of patients with diabetes.

Green tea trials show an average HbA1c reduction of 0.3%—a notable amount, since less than a 1% difference in HbA1c can mean a significant difference in disease risk.21,39 These studies demonstrate that green tea doesn’t just slightly lower blood glucose, it helps maintain healthy levels over time.

Protecting Against Neurodegeneration

Neurodegenerative disorders such as mild cognitive impairment, Alzheimer’s, and Parkinson’s are growing increasingly common. Unchecked, they rob the aging population of brain function, particularly cognitive abilities such as memory and attention.

Several studies have confirmed the link between tea consumption and protection from neurodegenerative diseases such as Alzheimer’s dementia and Parkinson’s disease.20,22,23 A team of researchers in China recently performed a meta-analysis, pooling results from several well-designed studies including more than 48,000 participants.2 What they found is that higher consumption of tea was associated with lower odds of cognitive disorders.

When researchers went further and looked at the effects of specific types of tea, they found that only green tea, not other types such as black tea or oolong tea, remained a significant predictor of beneficial cognitive outcomes. Green tea was associated with 36% lower odds of developing cognitive disorders.2

Several other studies have revealed similar findings, not just for cognitive decline and dementia but also for other neurodegenerative disorders such as Parkinson’s disease.17,20,22-24

Summary

Green tea is rich in an assortment of healthful plant compounds known as catechins. Studies consistently demonstrate that higher intake of green tea and its catechins is associated with lower risk for common age-related diseases, including cardiovascular disease, metabolic syndrome, cognitive dysfunction, and cancer.

It’s difficult and impractical to drink the large volume of green tea required to maximize its benefits. Green tea extracts make it far easier to increase catechin intake.

A new broad-spectrum green tea extract provides 8 different, highly bioavailable catechins. Encapsulating them in easily-absorbed liposomes further enhances their stability and bioavailability and equates to drinking the catechin content equivalent of up to 12 cups of standard green tea.

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


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Magnesium helps:¹²

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- Maintain normal muscle and nerve function.
- Support a healthy immune system.
- Keep bones strong.
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For full product description and to order Magnesium Caps, call 1-800-544-4440 or visit www.LifeExtension.com

References

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

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Green T-Max is a highly bioavailable broad-spectrum green tea extract from the mountains of South Africa.

One capsule of new Green T-Max delivers eight different catechins and provides the catechin content equivalent of up to 12 cups of standard green tea.
Battling ALLERGIES with PROBIOTICS

BY MICHAEL DOWNEY


Millions of people suffer from seasonal allergies and turn to prescription and over-the-counter medications to find relief.

Scientists have discovered a surprising alternative approach: probiotics.

The idea of using helpful bacteria to reduce allergic symptoms may sound radical, but clinical trials show it to be quite beneficial.

In one study, a specific probiotic, Lactobacillus acidophilus L-92, led to a 2.5-fold improvement in nasal allergy symptoms and a 4.7-fold improvement in eye symptoms compared to people using a placebo.¹

Other trials show that a combination of L. acidophilus L-92 and fermented yeast result in:

- 43% fewer days with nasal congestion
- 24% reduction in swollen nasal passages
- 31% reduction in eye symptoms²⁻⁴

These are significant findings for allergy sufferers.

A new combination of probiotic and fermented yeast works by targeting the root cause of allergies: an out-of-balance immune response.
Attacking the Cause of Allergies

Allergies affect more than 50 million American adults every year. They are the 6th leading cause of chronic illness in America, costing society more than $18 billion annually.\textsuperscript{5,6}

An allergic reaction occurs when the immune system overreacts to something in the environment that is harmless to most people. When the body perceives a threat from an allergen such as dust or pollen, it swings into defensive action. The result is watery eyes and a runny nose designed to flush the allergen out from the body.

These allergy symptoms are the last in a long, domino effect of reactions involving the body’s immune-system cells.

Once an allergy attack occurs, most people reach for over-the-counter medications for relief. The problem is that antihistamines, steroids (like Flonase®), and decongestants, only provide temporary relief.

A better solution is to stop the body from overreacting to harmless threats like pollen or dust.

For that to happen we need to restore normal immune balance—and that involves retraining immune system cells in what’s called the Th2 family.

Th2 cells are also known as T helper type 2 cells. Th2 cells play a role in organizing a protective immune response to outside invaders such as allergens.

Regulating the Immune Response

Researchers sought to identify ingredients that would work on the cause of allergic reactions by reining in the immune system’s Th2 cells. Scientists in Japan and the U.S. uncovered 2 compounds that help restore normal Th2 balance. These 2 supplements, \textit{Lactobacillus acidophilus} \textit{L-92} and \textit{yeast fermentate}, reduce symptoms by lowering the allergic response to pollen and other allergens.

This group of scientists began investigating probiotics for allergy relief because they are essential for a healthy gut, where many of the body’s immune cells reside.\textsuperscript{7}

When researchers compared 12 different probiotic strains in a lab study, \textit{L. acidophilus} \textit{L-92} stood out for its impact on seasonal allergies.\textsuperscript{8} Animal studies showed that this strain reduces levels of the inflammatory antibodies known as immunoglobulin E (which trigger the release of chemicals that cause an allergic reaction), reduces substances associated with Th2, and boosts cells associated with better immune balance.\textsuperscript{8,9}

Two ingredients have been identified, \textit{Lactobacillus acidophilus} \textit{L-92} and \textit{yeast fermentate}, that effectively retrain the immune system to take pollen and other allergens in stride and mute the excessive inflammatory responses that produce irritating allergy symptoms.
Similarly, a fermented form of baker’s yeast (Saccharomyces cerevisiae) called yeast fermentate reduces IgE, providing additional allergy relief.¹⁰

As a result, these 2 ingredients can quell allergy symptoms without causing the side effects seen with anti-inflammatory, antihistamine, or decongestant drugs.

To validate that these immune-balancing effects beneficially impact allergies, scientists conducted studies on human volunteers.

### Human Studies with L. acidophilus L-92

First, researchers focused on the allergy benefits of *Lactobacillus acidophilus* L-92).

People allergic to Japanese cedar pollen, a potent allergen, were enlisted for a clinical study that covered 2 consecutive annual allergy seasons. They received either a placebo or *L. acidophilus* L-92.³

In the first allergy season, the *Lactobacillus acidophilus* L-92 treatment group showed a 31% reduction in the eye symptom/medication score, which indicated reduced experience of itchy or watery eyes and the need for less medication. This improved eye symptom/medication score was found again in the second allergy season. Researchers also found a trend towards improved scores for reduced swelling and color of membranes lining the nostrils.³ (Allergic mucous membranes appear pale, while healthy membranes are pink.)

In a second study, researchers gave either a placebo or *L. acidophilus* L-92, every day for 8 weeks, to 49 people with year-round hay fever, which can be more difficult to manage than seasonal allergies.²

They documented an approximate 28% improvement in nasal membrane color at week 6 and an approximate 24% improvement in nasal membrane color at week 8. Patient-reported symptom/medication scores fell, compared with placebo recipients, by about 19% after 8 weeks. There was also a trend towards improvement in eye symptoms, such as itchiness and redness.²

A third trial, lasting 8 weeks, demonstrated the ability of *L. acidophilus* L-92 to alleviate symptoms in people who did not start taking it until after they were exposed to the allergen. Eighty volunteers with cedar-pollen allergy were exposed to this pollen for 3 hours before receiving the probiotic. The results were astonishing: Treated individuals demonstrated a 2.5-fold improvement in nasal symptoms and a 4.7-fold improvement in eye symptoms compared with placebo subjects.¹

### Seasonal Allergy Relief

- Current medications for seasonal allergies target the symptoms, like sneezing, runny nose, and itchy eyes.
- A novel approach focuses, instead, on the cause of allergies, restoring the normal balance between immune-system cells that promote allergic reactions and those that suppress them.
- In a major advance for allergy sufferers, the probiotic *Lactobacillus acidophilus* L-92 and yeast fermentate demonstrate the ability to restore immune balance.
- Human studies have shown that this “retraining” of the immune system substantially reduces the severity of allergic symptoms and the duration of seasonal allergies.
In several other studies, scientists found that *L. acidophilus* L-92 also has a favorable effect on eczema (*atopic dermatitis*), a condition closely related to seasonal allergies. This form of allergic response is characterized by itchy, scaly, oozing lesions on the skin, and can affect the skin on any part of the body. Taking this probiotic was shown to reduce symptom scores for eczema by more than 50% and to help reduce the spread of eczema from one part of the body to another.

Taken together, these findings demonstrate significant reductions in symptoms of seasonal and year-round allergies.

**Human Studies with Yeast Fermentate**

Scientists also performed clinical studies with yeast fermentate.

Researchers conducted a pilot study on 25 healthy individuals, giving them either a placebo or 500 mg of dried yeast fermentate daily for 5 weeks during the beginning of the allergy season. The placebo treatment had no effect. But half of the treated male volunteers reported a complete absence of allergy symptoms, which fully returned 1-2 weeks after they stopped taking the supplement.

Antibodies called IgE are one of the causes of hay fever symptoms. Based on this study, researchers surmised that yeast fermentate helps reduce IgE.

IgE causes the body to release chemicals (like histamines) that cause an allergic reaction and produce symptoms that can affect the eyes, nose, throat, lungs, or skin.

Over the course of this 5-week study, as the allergy season went into full swing, blood levels of IgE steadily increased among placebo recipients indicating heightened allergic responses.

In those subjects taking the yeast fermentate, IgE levels barely changed, indicating a reduced allergic reaction. The conclusion from this study is that yeast fermentate calms allergic responses by stabilizing IgE levels.

A larger clinical study was then undertaken, with 96 people who had a documented history of seasonal allergies and hay fever. During the highest pollen-count portion of the year, participants took either a placebo or 500 mg of dried yeast fermentate once daily.

The first 6 weeks of the 12-week study took place during the highest pollen-count period. During this time, scientists documented a reduction in the severity of runny nose and nasal congestion in the treatment group. Compared to a placebo group, the supplemented subjects experienced 43% fewer total days with nasal congestion. By the end of the study, they also showed decreased levels of white blood cells in their nasal mucus, indicating reduced activation of allergy-triggering cells.

These clinical effects deliver clear and substantial quality-of-life improvements for those who suffer from seasonal allergies.
The Risks of Allergy Medications

During allergy season, people resort to an assortment of over-the-counter medications such as antihistamines, steroids, and decongestants.

To alleviate symptoms, these drugs are intended to block the histamines and suppress the inflammation that produce runny noses, and watery eyes.

But allergy medications come with many potential side effects, including drowsiness, constipation, headache, rapid heartbeat, and sleep problems. In fact, drugs from the category called anticholinergics — which includes some commonly used anti-allergy medications like diphenhydramine (Benadryl®) — have been associated with a potentially increased risk of Alzheimer’s disease.15

Here is a list of possible side effects:14

**ANTIHISTAMINES:**
Drowsiness, dry mouth/nose/throat, stomach problems, blurred vision, and constipation.

Examples: Benadryl®, Claritin®, Zyrtec®, Allegra®, Claritin Eye® (eye drops)

**NASAL CORTICOSTEROIDS:**
Nasal dryness/irritation, nosebleeds, throat irritation, headache, nausea, vomiting, cough, and (with long-term use) fungal infections of the throat, immune suppression.

Examples: Flonase® (nasal), Nasacort® (nasal)

**MAST CELL STABILIZERS:**
Stinging sensation inside the nose.

Examples: Alomide® (eye drops), Intal® (inhaler), Nasalcrom® (nasal)

**LEUKOTRIENE INHIBITORS:**
Weakness, upset stomach, earache, dizziness, cough, headache, trouble sleeping, and (less likely) flu-like symptoms.

Example: Singulair®

**NASAL DECONGESTANTS:**
Burning/stinging/dryness in the nose, runny nose, and sneezing.

Example: Afrin®

**ORAL DECONGESTANTS:**
Dizziness, headache, nervousness, fast heartbeat, increased blood pressure, loss of appetite, and problems sleeping.

Example: Sudafed®

**NASAL ANTICHOLINERGICS:**
Bloody/dry nose, nasal congestion, dry mouth, bad taste in the mouth, irritated throat, dizziness, and nausea.

Example: Atrovent®

**TOPICAL CORTICOSTEROIDS (FOR SKIN ALLERGIES):**
Burning, itching, redness, changes to skin color, and thinning of skin.

Example: Cortalid®

**TOPICAL IMMUNOMODULATORS (FOR SKIN ALLERGIES):**
Stinging, burning, irritation, itching at the application site, and possibly headache and flu symptoms.

Example: Protopic® ointment
Summary

Mainstream allergy medications target symptoms, not the root cause of the problem, and come with an array of potential side effects.

Scientists have identified 2 ingredients that retrain the immune system not to overreact to pollen and other allergens, muting the excessive inflammatory responses behind allergy symptoms.

In human studies, the probiotic *Lactobacillus acidophilus* L-92 and yeast fermentate substantially reduced seasonal allergy symptoms, such as swollen nasal passages and eye irritation, and resulted in **43%** fewer days with nasal congestion.

These two supplements provide a unique option for improving the quality of life in allergy sufferers.

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

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Magnesium is a major factor in promoting a healthy cardiovascular system.

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Potassium with Extend-Release Magnesium provides 250 mg of two forms of magnesium plus 99 mg of potassium.

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TAURINE
Protects Against Age-Related Brain Changes

BY AMY HUANG

For decades, it was assumed that new brain cells stop being produced once a person is fully grown.

Recent findings prove that isn’t true. Adults at any age have an ability to create new brain cells.

A low-cost supplement called taurine has been shown to enhance this youth-restoring process.

Taurine protects against neurotoxins in ways that can slow age-related neurological decline.¹,²

Preclinical studies show that taurine reduces the kind of damage that people experience as a result of stroke or injury to the brain.³-⁹

Higher intake of taurine earlier in life is associated with better cognitive function in the elderly.¹⁰

The body makes only small amounts of taurine.¹,¹¹ To boost taurine levels, it must be acquired from the diet or through supplementation.
The Functions of Taurine

Taurine is an amino acid that helps maintain healthy cells throughout the body.

It is critical for the peak functioning of mitochondria, the “power plants” that supply cells with energy.12,13

Mitochondrial function wanes with age, impairing cellular function and making it harder for cells to defend themselves from stress and injury.14

This is especially true in the brain,15 one of the most metabolically active organs in the body.

Taurine also has many other ways it may help protect and optimize brain health, including:

- Stimulating new brain cell growth,2,16,17
- Protecting against excitotoxicity (harmful overactivity in the brain),18
- Defending against toxins that can damage the brain,19,21
- Minimizing brain damage caused by stroke and head injuries, and3-9
- Preserving normal cellular function and energy supply by regulating calcium, protecting cell membranes, and more.3,22,23

Through these mechanisms, taurine may help protect the aging brain against cognitive impairment, dementia, and damage from strokes, head injuries, and neurotoxins.

Neurogenesis: Keeping the Brain Tuned Up

Preclinical studies show that taurine boosts creation of new brain cells.1,2 This is called neurogenesis, and it is a key to preserving healthy brain function as we age.

When neurogenesis occurs during brain development, it refers to brain cells growing, dividing, and maturing. But neurogenesis doesn’t stop after development.

Throughout life, we must maintain healthy, functional brain cells. We also need to protect the connections between those brain cells. All our brain functions—from controlling movement to high-level cognitive tasks like speaking, learning, and remembering—require these vital connections.

Neurogenesis dwindles with age. As a result, our brains shrink. The critical neural connections then become diminished. This can start the slippery slope into cognitive impairment and dementia.

By encouraging the creation of new brain cells,1 taurine could help combat age-related decline in cognitive function.
Several cell and animal studies show that taurine helps “wake up” brain stem cells, stimulates new brain cell production, and supports their survival.\(^1,2,16,17,24-26\)

This type of effect has been observed in both young, developing brains and in older brains. In one study of middle-aged mice, taurine activated stem cells.\(^1\) Significantly, this happened in the hippocampus, a brain region critically important for the formation of new memories. This has obvious ramifications in the fight against Alzheimer’s and dementia.

In addition to activating stem cells, taurine produced new cells and supported their survival, while also reducing harmful inflammation in the brain.\(^1\)

### Defense Against Excitotoxicity

**Excitotoxicity** has long been known to contribute to the damage that occurs after traumatic brain injury and stroke.\(^27\) More recently it has also been linked to the progression of dementia in the elderly.\(^28\)

Excitotoxicity is the process by which brain cells are damaged or killed when certain receptors in the brain are overactivated. This is most often seen with the neurotransmitter glutamate.

Glutamate is critical for normal brain function. It sends signals between nerve cells and plays a role in learning and memory.

Overstimulation of brain cells by chronic, high levels of glutamate causes dysfunction and programmed cell death.\(^29\)

**Taurine** protects against excitotoxicity by blocking and reducing the overstimulation caused by excess glutamate.\(^3,18,30\) Normally, cells die soon after they’re exposed to high concentrations of glutamate. But when pre-treated with taurine, cells survive under these conditions.

This is a profound finding given how important excitotoxicity is in the development of many common brain disorders.

### Brain-Damaging Beta-Amyloid

Taurine’s ability to defend against excitotoxicity and halt cell death makes it ideally suited to preventing age-related degeneration of the nervous system, including Alzheimer’s and dementia.

Animal studies show that taurine also reduces 2 additional factors that contribute to cognitive decline and risk for dementia: the toxic effects of beta-amyloid accumulation and inflammation.\(^30-32\)

In a study published in the journal *Neuropharmacology*, taurine protected rat brain cells from the toxicity normally induced by beta-amyloid deposits.\(^30\)
At least some of this protective effect appears to be due to taurine’s ability to directly bind to beta-amyloid. A study using a mouse model of Alzheimer’s disease observed this amyloid-binding, which correlated with improvements in cognitive function on various tests.

A rat model of cognitive decline also showed that taurine helped protect brain function, defending against oxidative stress, boosting neurotransmission, and reducing brain inflammation.

**Protection Against Dementia**

All these studies showing taurine’s protective effects suggest that supplementation with it could be a valuable preventive measure against Alzheimer’s and dementia.

A group of researchers in South Korea explored the link between taurine and protection from dementia in the elderly. They estimated the past intake of taurine in 40 older individuals with dementia and compared it with that of 37 healthy people of the same age.

What they found was that elderly people with dementia had a significantly lower level of taurine intake than healthy subjects did when they were younger. The average intake of taurine in healthy subjects was approximately 18% higher than in those who developed dementia.

This study also showed that the amount of taurine intake correlated with the degree of cognitive function. In other words, those who had the highest intake of taurine had the best scores on cognitive tests.

In another study, on elderly women, 1,500 mg of taurine daily helped reduce inflammation, protect the health of the blood-brain barrier, and improve cognitive test scores over 14 weeks.

These studies indicate that taurine supports healthy brain function and may protect against Alzheimer’s disease and dementia.

**Diminishing the Impact of Stroke**

Strokes can have devastating effects on cognition and brain function.

They can be generally divided into 2 major types: ischemic stroke and hemorrhagic stroke.

Ischemic stroke is more common, and occurs when blood flow is reduced or blocked to a part of the brain, leading to cell death and loss of function.

In an animal model of ischemic stroke, supplemental taurine decreased the volume of brain damage caused by a stroke by about 55% compared to animals that did not receive treatment.

Additionally, several markers of injury severity, including oxidative stress and energy production in the brain, were reduced in animals given supplemental taurine.

Hemorrhagic stroke refers to sudden, spontaneous bleeding into or around the brain. Although less common than ischemic stroke, it still affects many older individuals, particularly those with high blood pressure.
A rat model of hemorrhagic stroke showed that taurine protects against the brain damage caused by this type of stroke as well. Rats given taurine had reduced loss of function with hemorrhage and suffered less brain swelling and inflammation.

Reducing Damage Due to Head Injury

Head injuries are difficult on elderly individuals. Trauma from falls or other accidents can cause significant loss of brain function.

Several preclinical studies have demonstrated that taurine improves the outcomes of these types of injuries.

In one study, taurine prevented brain cell damage after experimental head injury in rats. The treated animals also experienced improvements in brain blood flow and enhanced mitochondrial function.

Several other animal studies have shown that taurine not only protects the brain from damage, but also improves function after a head injury.

Reducing the Effects of Neurotoxins

Taurine may help protect the brain from neurotoxins that damage the nervous system.

One of the most common damaging compounds is glucose, especially at the high levels seen in diabetes. In animal models of diabetes, elevated blood sugar leads to inflammation, oxidative stress, and DNA damage in the brain.

In a recent study, experimental diabetes in rats caused all these harmful cellular changes in multiple areas of the brain. But treatment with taurine reduced all these effects.

Taurine also protected the brains of animals exposed to the toxic effects of several compounds, including arsenic, volatile gases, and other known neurotoxins.

Summary

Taurine is an amino acid that is critical to healthy cellular function, particularly in highly active tissues like the brain.

Remarkably, taurine appears capable of boosting the creation of new brain cells at any age.

Taurine also protects against toxicity, oxidative stress, and inflammation. As a result, taurine may help prevent age-related cognitive decline, dementia, and injury from stroke and head trauma.

Only small amounts of taurine are produced in the body. By supplementing with taurine, you can help maintain optimal levels necessary for prolonging peak cognitive function into old age.

Fortunately, taurine is not a bulky amino acid, meaning that 1,000 mg can be obtained by taking just one capsule daily.

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


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

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

Cognitex® Elite provides all of these ingredients:
- Sibelius™: Sage extract (leaf) 333 mg
- AuroraBlue® Wildcrafted Blueberry Complex 200 mg
- Ashwagandha extract 125 mg
- Phosphatidylserine 100 mg
- Uridine-5'-monophosphate 50 mg
- Vinpocetine 20 mg

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

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Numerous published studies describe how concentrated extracts in Pycnogenol® help protect against multiple factors related to premature aging.

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Research has found that taurine can promote **new cell formation** in the area of the brain associated with **learning** and **memory**.

Taurine also enhances **neurites**, tiny projections that help brain cells communicate with each other.

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The public is largely aware of the dangers of high blood sugar.

Chronically elevated blood glucose levels damage almost every tissue in the body and accelerate degenerative aging.

A related condition that often goes undiagnosed is elevated fasting insulin.

Long before blood sugar rises, levels of the hormone insulin can be dangerously high.

Elevated fasting insulin is linked to a number of health problems including cancer, Alzheimer’s, high blood pressure, and atherosclerosis.¹⁻⁸

Not only is fasting insulin seldom checked for, but over-secreting of insulin by the pancreas can artificially lower blood glucose. This can allow a diabetic state to fester for decades before glycemic control is lost, and full-blown type II diabetes develops.

It doesn’t need to be that way.

Fasting insulin can be checked by low-cost blood tests. When elevated, insulin can be reduced through diet, exercise, certain nutrients, and the AMPK-activating drug metformin.
Glucose levels may remain normal, but insulin is still working overtime. This elevated blood insulin level has numerous negative effects on metabolism and leads to changes that can cause disease.1-8

The Dangers of High Fasting Insulin
Research has found that high fasting insulin, or hyperinsulinemia, is linked to a vast range of major health problems, including:

- High blood pressure7,9,10
- Obesity2,10,11
- Atherosclerosis12
- Type II diabetes13,14
- Cancer5,15,16
- High triglycerides (which contribute to hardening of the arteries)7,17-19
- Low HDL cholesterol (the “good” cholesterol)7,18,20
- Polycystic ovary syndrome21
- Gout22
- Benign prostatic hypertrophy (prostate enlargement in men)23
- Migraine headaches24
- Erectile dysfunction25
- Skin tags26
- Inner ear problems, including tinnitus, vertigo, and hearing loss27
- Alzheimer’s disease6 and
- Increased risk of heart attack and stroke28

The list is shockingly long. And the medical literature supporting the connection between high fasting insulin and these conditions continues to grow.

As a whole, the research shows that unchecked high fasting insulin increases the risk for rapid aging of all tissues and numerous degenerative diseases that result.
Testing for Fasting Insulin Levels

Clearly, elevated fasting insulin is a serious problem. But few people know they have it. It is not routine medical practice to screen for fasting insulin levels. As a result, insulin resistance and hyperinsulinemia usually go unnoticed until blood sugar rises or overt symptoms begin to show.

By that point, high fasting insulin may have done damage that can lead to disease and loss of function over time.

The solution is simple: Get tested. Even people with normal glucose levels should talk to their doctors about having fasting insulin tested regularly.

A fasting insulin test is a helpful tool in the diagnosis of insulin resistance and type II diabetes and may save your life.

The hormone insulin is secreted primarily in response to the intake of carbohydrates. It helps the transport of glucose from the bloodstream into the cells.

Life Extension® believes an ideal fasting insulin level to be <5 μIU/mL.

Additional blood tests to screen for persistently high blood sugar include hemoglobin A1c, fasting glucose, and the glucose tolerance test.

The Link Between Fasting Insulin and AMPK

Treating—or, even better, preventing—high fasting insulin levels is vital.

Unfortunately, most medical treatments address the different symptoms and effects of hyperinsulinemia, not the root problem itself.

For example, doctors generally recommend anti-hypertensive medications to lower blood pressure, and statins to improve cholesterol. These medications help by treating the symptoms, but they don’t address the high fasting insulin levels that caused the underlying problems in the first place.

A better approach would be to correct insulin resistance to keep fasting insulin in the normal range. Only then can a person prevent or correct the harmful effects of excess insulin.

Fortunately, there’s an enzyme found in every cell in the body, called AMP-activated protein kinase (AMPK), that can help get insulin levels back to normal.

When activated, AMPK improves metabolism, boosting cells’ sensitivity to insulin and counteracting many of the detrimental effects discussed above, including weight gain and many age-related diseases.8,29,30
AMPK activation has several specific effects on metabolism, including:8

- Improved glucose transport into cells,
- Improved function of the mitochondria, the “power generators” of the cell,
- Enhanced breakdown of fats,
- Reduction of oxidative stress,
- Reduced inflammation, and
- Activation of sirtuins, proteins that regulate cellular health and are associated with lifespan extension in many models.

The end result of these effects? Reduced insulin resistance and lower levels of fasting insulin.

The objective is to find ways to “amp up” AMPK’s activity. The four known ways to do this are with exercise, dietary changes, medication, and natural supplements.

Activating AMPK with Exercise and Diet

We all know that getting regular physical exercise has many health benefits, like burning calories and toning muscles.

But one benefit is often overlooked: Exercise directly stimulates cells to increase AMPK activity.31,32 This is why exercise is associated with weight loss and metabolic benefits beyond what can be accounted for simply by the number of calories burned.

The converse is also true. A sedentary lifestyle leads to lower AMPK activity,9 and is well recognized as a risk factor for obesity, type II diabetes and metabolic syndrome.

The modern Western diet is also partly to blame for many of the metabolic diseases from which people suffer, including hyperinsulinemia. Diets that are high in calories, carbohydrates, and fats put a strain on the system and force insulin levels up, leading to insulin resistance and high fasting insulin levels.

Eating healthier foods and fewer total calories can go a long way towards improving metabolism and boosting AMPK activity. In fact, calorie restriction, either by total reduction in the number of calories consumed or by intermittent fasting, has been shown in research studies to be an activator of AMPK.31,33

For most people, though, making dramatic and consistent changes to diet and exercise is difficult. There are other options that can also be powerful AMPK activators.

Medication and AMPK

Metformin is a drug that, for years, has been used to control elevated blood glucose in patients with type II diabetes.

It works, in part, because it is a potent activator of AMPK, helping to correct underlying metabolic problems and reduce insulin resistance.34-36

For this reason, the medical applications of metformin have been expanding. It is now being used to treat more than just diabetes and is being hailed as a means to slow the aging process and reduce weight gain.34,36,37

Though it is derived from a compound found in the French lilac plant, it is a synthetic medication and requires a physician’s prescription.

LifeExtension® has recommended metformin as an anti-aging drug since 1995, and the scientific literature continues to support its many benefits. Some people, however, experience gastro-intestinal side effects and cannot take metformin. Others encounter problems persuading their doctor to prescribe metformin for its diabetes-prevention properties.
Using Plant Compounds to Boost AMPK

Fortunately, other plants contain natural compounds with similar AMPK-activating properties. *Gynostemma pentaphyllum* is a plant native to parts of Asia. It is known as the “immortality herb” by some local cultures.

Several animal and cell culture studies have shown that *G. pentaphyllum* and its extracts are activators of AMPK and have related health benefits.38-42

For example, a study utilizing a mouse model of obesity found that by activating AMPK, *G. pentaphyllum* decreased body weight and cholesterol levels.39

More impressively, human studies have demonstrated metabolic and body fat improvements with *G. pentaphyllum* comparable to those seen with metformin.

A study published in the medical journal *Obesity* randomized 80 overweight or obese subjects to receive either 450 mg per day of a *G. pentaphyllum* extract or a placebo.41

Over a 12-week period, several markers of body fat were reduced in those subjects receiving *G. pentaphyllum*. Total abdominal fat area, body weight, body fat mass, percent body fat, and body mass index were all reduced in the *G. pentaphyllum* group, compared to the placebo.

Although all excess body fat can have negative effects, abdominal fat has the strongest impact, significantly contributing to metabolic disease and all its harmful effects.43 Total abdominal fat was reduced by 6.3% over the 12-week period of this study.41

A compound found in citrus fruits called hesperidin has also been found to increase AMPK activity.44-46

A study of mice fed a high fat diet demonstrated that hesperidin supplementation significantly reduced body weight, body fat deposition, blood glucose, lipid levels, and insulin levels. It also reduced a measure of the degree of insulin resistance (the HOMA-IR index).45

In human studies, as well, hesperidin has demonstrated the benefits that come with AMPK stimulation.44,46 In one study, published in the *Journal of Clinical Endocrinology & Metabolism*, patients with metabolic syndrome, randomized to receive 500 mg of hesperidin per day, benefited from both improved blood vessel function and a reduction in circulating markers of systemic inflammation.46

By activating AMPK, both *G. pentaphyllum* and hesperidin can help bring high fasting insulin levels back under control.
Summary

The dangers of high blood glucose levels associated with metabolic syndrome and diabetes are well known.

But there is another related, yet often undiagnosed threat.

Insulin resistance and high levels of fasting insulin—even in the absence of high glucose—can wreak havoc on our metabolism and lead to numerous long-term effects, ranging from high blood pressure to cancer.

This condition is often missed during routine blood testing that typically measures only markers of elevated glucose, not insulin. Low-cost fasting insulin blood testing can remedy this.

If it’s discovered, elevated fasting insulin can be corrected. Boosting the activity of the enzyme AMPK can help resolve metabolic abnormalities, improving insulin sensitivity and preventing the negative effects of high fasting insulin.

Exercise and dietary changes both help activate AMPK.

Medications such as metformin, and natural plant products, including G. pentaphyllum and hesperidin, have also been shown to have potent AMPK-activating effects.

Together, these interventions can help get high fasting insulin levels under control and prevent the downward spiral into chronic diseases, with which they are associated.

Fasting insulin has been added to the popular Male and Female Blood Test Panels that many readers of this magazine have done annually. Until June 3, 2019, the cost of these comprehensive test panels is reduced to only $199.

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


(References continue on page 64.)
Comprehensive Blood Tests at **Low Super Sale Prices**

The value of the **Male** and **Female Blood Panels** improves as more tests are added at no additional cost. Last year, **apolipoprotein B** was added to better measure vascular risk. This year, **fasting insulin** has been added to provide a clearer picture of one’s metabolic status. If elevated, steps to reduce fasting insulin can help assist with weight loss and achieving better glucose control. See the huge number of parameters included in these test panels:

### MALE PANEL

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

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

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

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

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

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

### FEMALE PANEL

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

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

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

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

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

---

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To obtain these comprehensive Male or Female Panels at these low prices, call **1-800-208-3444** or log on to [www.LifeExtension.com/blood](http://www.LifeExtension.com/blood) to order your requisition forms.

Then—at your convenience—when you have the form, you can visit one of the blood-drawing facilities provided by LabCorp in your area or at the **Life Extension Nutrition Center** in Ft. Lauderdale.

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


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AGE REVERSAL UPDATE
This article describes a wish list I am working on for this year’s Revolution Against Aging and Death conference (RAADfest 2019).

I also distinguish between the two full time jobs I have, so that you understand the difference between Life Extension® and the Age-Reversal Network.

Most of you support Life Extension by utilizing our lab test services along with science-based nutrient formulas.

Proceeds are contributed to other, entirely distinct organizations to help fund activities related to combating government malfeasance and supporting biomedical research.

I support both of these activities because inappropriate bureaucratic actions hinder lifesaving advances.

A growing number of our supporters want to do more than delay aging and reduce disease risks. They want to participate in clinical trials and/or self-experiment (under physician supervision) with groundbreaking techniques that demonstrate rejuvenation effects in lab animals and in small, proof-of-concept human studies.

For these individuals, a public benefit group called Age-Reversal Network has been formed. Its mission is to identify, evaluate, and validate regenerative medicine interventions that appear to be working and detect those that are not.

The Age-Reversal Network consists of dedicated physicians, scientists, and lay people who recognize that it may now be possible to enable old people to at least partially grow biologically younger.

Indicators of age-reversal are determined by clinical measures (such as lowered blood pressure), aging biomarkers (such as reduced inflammation) and symptomatic improvements (such as better sleep/greater exercise endurance).

People interested in receiving free email Age-Reversal Updates can register at: www.age-reversal.net/join

For those who want to wait for more concrete evidence, your support of Life Extension enables me to contribute more funding to age-reversal research groups, while availing yourself to nutritional protocols based on our 39-year commitment to longer, healthy lifespans.

A side benefit to the age-reversal research is the design of nutrient formulas that have similar regenerative mechanisms as those being demonstrated in human studies.

Working two full-time jobs is challenging. The prospect of regaining youthful functionality, however, has become a relentless passion for me. We are so close to meaningful success. The thought of squandering time on something like a vacation is impossible to contemplate.

This article provides updates on age-reversal interventions and an unprecedented plan by the Age-Reversal Network to launch a clinical trial this year designed to keep study participants alive and functional for an indefinite period.
The Concept of Age Management

In 1980, the first edition of *Anti-Aging News* was published. This newsletter provided information about ways of slowing degenerative aging processes.

While the media ridiculed this notion, a study published in 2018 documented an almost 4-year delay in the rate of biological aging that occurred in the period of 1988 to 2010.

This study found that the degree of age delay had a lot to do with modifiable health behaviors, many that were suggested in early publications of *Anti-Aging News*.

This means people like you, who engage in healthy lifestyle choices, are likely to be degenerating at a far slower rate than the national average age delay of 4 years.

Prospect of Human Age-Reversal

From 1980-2014, groups I work with focused on disease prevention, identifying better treatments, and slowing specific aging mechanisms.

Beginning in 2014, a convergence of published studies indicated that it might be possible to reverse many aspects of biological aging.

This was demonstrated in a series of parabiosis studies whereby the circulatory systems of old mice were joined together with young mice. Consistent results documented systemic rejuvenation along with lifespan increases in longer studies.
While human studies to emulate these parabiosis findings are in planning phases, a number of other interventions have emerged that are easier to administer and far less costly.

At RAADfest 2018, I announced a sequential order of age-reversal interventions based on animal data and findings from small, human proof-of-concept studies.

RAADfest 2018 attendees were provided with a printed booklet to guide them step-by-step on a logical approach to emulate animal studies that were revealing age delay, age-reversal, and in some cases, improvements in healthy survival.

For the first time in history, people had a roadmap to potential systemic rejuvenation interventions.

Challenges in Implementing the Interventions
The problem for those who wanted to follow the sequential order of interventions was finding physicians to prescribe the medications and oversee the patients, identifying affordable sources of the medications, and collecting consistent baseline and follow-up data.

Collection and analysis of these data is critical to monitor how effectively these interventions are working on larger groups of maturing people with differing underlying age-related pathologies.

I had hoped that physicians and participants would follow as much as possible the guidelines disseminated in the RAADfest 2018 booklet, along with the two RAADfest 2018 presentations I made.

---

Study Finds Young Bone Marrow Rejuvenates Aging Mouse Brains

A new study found that transplanting the bone marrow of young laboratory mice into old mice prevented cognitive decline in the old mice, preserving their memory and learning abilities.

This supports an emerging model attributing cognitive decline partly to the aging of blood cells produced in bone marrow.

Microglia in brains of old mice have fewer/shorter branches than young mice.

Credit: Cedars-Sinai / Communications Biology
https://medicalxpress.com/news/2019-02-young-bone-marrow-rejuvenates-aging.html?fbclid=IwAR2AVwO0Zv_57_rQgHumPX1tuOeUIdzDC12AMSdCTGuVQXChBq5MB1MSZ-g
Instead, many physicians and participants used some of the recommendations we freely distributed while omitting others. Gaining access to affordable sources was a challenge and there were often no qualified physicians in locations where participants resided.

So we had to go back to the drawing board to accelerate implementation of an intensive study of interventions that may help rejuvenate elderly individuals and save their lives.

The clinical trial I describe next is not yet confirmed, but represents what dedicated groups are seeking to accomplish this year based on favorable results from human proof-of-concept studies.

Please know that full-time scientists, as well as numerous volunteers at the Age-Reversal Network, are working around the clock to turn what you’re about to read into reality this year!

First-Ever, Multi-Modal, Human Age-Reversal Study

A confluence of scientific findings has enabled the Age-Reversal Network to help formalize a clinical trial concept whereby the regenerative effects of a series of protocols will be evaluated over an extended time period.

This human study is seeking institutional review board approval to initiate a sequential order of plausible age-reversal interventions and to collect data on each subject to assess clinical measures and aging biomarkers.

At RAADfest 2019, we expect that those interested in participating can meet with study physicians from around the United States (and other countries). In many cases, those who enroll can begin the first of several interventions during the RAADfest 2019 conference that will be held in Las Vegas on October 3-6, 2019.

Newcastle University Scientists are Killing Zombie Cells to Reverse Age-Related Damage in the Heart

“...senescent cells – also known as zombie cells – form in the heart during aging and lead to heart failure.”

“Newcastle scientists, in collaboration with researchers in the Mayo Clinic...have not only discovered how this process takes place in the heart, but also how it can be reversed or treated.”

Metformin Pioneer Advocates for Senolytics

Senolytics are “absolutely ready” for clinical trials, says Dr. Nir Barzilai, founding director of the Institute for Aging Research at the Albert Einstein College of Medicine.

“I think senolytics are drugs that could come soon and be effective in the elderly now, even in the next few years.”
Funding is being raised to enable the first 50 subjects to participate at a very low cost. The reason a minimum enrollment fee is being assessed is to ensure that people continue in the program. When considering the value of the medications and blood tests provided to study subjects, this nominal deposit represents a huge cost savings.

After the initial 50 subjects are enrolled, the remainder will have to self-fund their own costs of participating in this clinical trial until more donations are received. Please know we are scouring the Internet pharmacies for the lowest cost sources of quality interventions and paying the costs of assaying them for purity and potency.

This article provides details about this clinical trial and what you will learn at this year’s RAADFest.

RAADFest Annual Conference
Revolution Against Aging and Death
October 3-6, 2019
Las Vegas, Nevada
Register at: WWW.RAADFEST.COM

The Perpetual Clinical Trial

After nearly 5 years of persistent advocacy, it became clear that a formal network of physicians was needed to initiate a meaningful long-term clinical study. This requires IRB (institutional review board) approval for the various interventions that will be studied, along with a broad range of datasets to measure rejuvenation efficacy.

This type of multi-center study is the only way we can validate our evolving sequential order of age-reversal interventions that include:

- **AMPK** activation (along with suppressing excess mTORC1)
- Restoring youthful NAD⁺ levels
- Eliminating senescent cells (senolytic therapy)
- Rapamycin (autophagy inducer)
- Stem cell exosome factors from several sources (biologics)
- Additional interventions (as we validate them in pilot studies)

In 2001, the government banned stem cell research in any facility that received federal funding. This stopped most stem cell research. Life Extension sought to overturn this federal ban, but did not win this battle. We must never again allow the government to interfere with lifesaving biomedical research.

American Heart Association®

NAD⁺ May Improve Heart Function

“Stabilizing the intracellular NAD⁺ level represents a promising therapeutic strategy to improve myocardial bioenergetics and cardiac function.”

“In this issue of Circulation, Diguet et al report exciting data suggesting that supplementation with a NAD⁺ precursor, nicotinamide riboside, reduces cardiac dysfunction in preclinical models of heart failure.”

—May 21, 2018
There are now a variety of options to accomplish Steps 1 through 5 of the interventions listed on the previous page.

We’ve established a new charity to raise funding for the first 50 study subjects. While I and a few others continue to financially support several research initiatives, the costs of this unprecedented Perpetual Clinical Trial will require tax deductible contributions from those with the wherewithal to do so.

Please know that there are no salaried employees or other overhead expenses that typically eat up a substantial portion of a charity’s budget. I donate my time as well as my personal monies to accelerate these research endeavors.

The significance of this research is so profound that physicians are donating their time, along with my time as well as our personal monies to accelerate research endeavors.

Aging, Cell Senescence, and Chronic Disease: Emerging Therapeutic Strategies

“...many human pathologic conditions are associated with the presence of senescent cells.”

Interventions aimed at eliminating those senescent cells, commonly called senolytic, have also been shown to improve health and extend life in various mouse disease models.

“If senolytics are shown to be safe and effective in humans, they could transform care of older adults and patients with multiple chronic diseases.”

We’ve reached a point, however, whereby a formalized study is needed with hard costs built in to ensure we deliver quality medications and meticulously measure the results in the initial study group of 50 aging humans.

We call it “The Perpetual Clinical Trial” because there is no upper limit to how long we will attempt to restore youthful functionality in elderly individuals. In addition to the 50 initial study subjects, we expect many more will join this study group on a self-funded basis.

I ask those with the wherewithal to prioritize this charitable endeavor and send a tax-deductible check to:

Human Age-Reversal Project
300 NE 20th St. Apt. 409
Boca Raton, FL 33431

Most of you reading this, like me, are aging and cannot wait for others to do a multi-center clinical trial involving a sequential order of age-reversal interventions. These therapies have demonstrated degrees of efficacy in proof-of-concept studies that I and a few others have helped support over the past several years.
What We Plan for RAADfest 2019

I have a track record of taking on ambitious projects that sometimes succeed, like defeating the FDA and other bureaucracies in what were considered “impossible to win” court cases.

I also helped initiate and push through federal legislation to protect consumer access to low-cost dietary supplements.

My plan for this year’s RAADfest is to have age-reversal interventions available to attendees during the morning and evening periods. This includes physician consultations, NAD+ patches or infusions, physician-determined prescriptions for metformin (AMPK activator), dasatinib (senolytic), rapamycin (autophagy inducer) and other regenerative interventions.

There may even be physicians able to administer stem cell exosomes during the breaks at the conference.

The Age-Reversal Network is carefully evaluating several options that include umbilical cord stem cells and/or umbilical cord plasma/exosomes, laboratory harvested exosomes, and more. We seek to validate what appears to be working from those therapies that have not yet demonstrated efficacy.

So at this year’s RAADfest, you will see live, on-stage presentations by physicians and scientists on the cutting edge of rejuvenation research and hopefully gain access to some of these interventions during the conference.

The challenge of organizing and coordinating this program is enormous. It’s never been attempted with a large group like this.

The benefits of RAADfest attendees gaining immediate access to potential age-reversal interventions (instead of just watching presentations about them) are too important to delay. I want RAADfest attendees to not only learn about a wealth of lifesaving information, but to have the option of utilizing some of these approaches while at RAADfest.

I next describe how you can register to attend the RAADfest 2019 event. For those who cannot attend but want to keep informed, I suggest you enroll to receive free email updates at the Age-Reversal Network website:

www.age-reversal.net

How to Register for RAADfest 2019

What distinguishes RAADfest from other scientific conferences is keeping the group of attendees, speakers, physicians/scientists together throughout most of the event.

This includes free organic lunches and dinner where the group moves from the lecture hall to a dining room for one-on-one interactions. We don’t want anyone to feel lost in the crowd. We are ALL in this together.

Several registration packages are offered for RAADfest. Each package provides extraordinary value that includes several organic meals, lodging on site, as well as other attractive extras. Not to mention the exceptional information and experience that RAADfest offers.

RAADfest Annual Conference
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About Health in a Different Light
Proton Pump Inhibitors Raise Risk of Liver Cancer

For decades, people have been taking proton pump inhibitor drugs (PPIs) like Prilosec OTC® and Nexium® to treat heartburn, acid reflux, ulcers, and other related ailments.

But now a new study establishes a disturbing link between taking those drugs and the rate of developing liver cancer.¹

In a shocking finding, individuals’ PPI use was associated with an 80% increased risk of liver cancer, compared with people who did not use PPIs.¹

There have been other ominous findings about this drug category previously. Studies have shown that PPIs can reduce nutrient absorption, cause bacterial overgrowth, and are associated with increased risk of cardiovascular, kidney, and neurodegenerative brain diseases.²-⁶

The new findings are the most alarming yet. While PPIs, which reduce the production of stomach acid, have a role in short-term symptom management, the list of troubling issues linked to their long-term use is growing. Now liver cancer has been added to that list.

In this Research Update, we review the new epidemiological study to see precisely what the researchers found, and we explore safe alternatives to relieve symptoms.
In the case-control study, PPI use was associated with an 80% increased risk of liver cancer. The strongest PPI drug-specific association, with an 83% increased risk of liver cancer, was with omeprazole, most commonly sold as Prilosec® or Zegerid®.

In the prospective cohort study, which looked at nearly 500,000 participants, those individuals who had used PPIs nearly doubled their risk of liver cancer compared with people who had never used them.1

Potential Mechanisms Linking PPI Use to Liver Cancer

Even the strongest epidemiological studies cannot determine causality. Does exposure to drug X cause disease Y?

The main study we review here does not prove that PPIs cause liver cancer. But it does establish a close connection between exposure to the drugs and development of the cancer.
Evidence that Proton Pump Inhibitors Pose Health Threats

More than a quarter of a century ago, people with gastroesophageal reflux disease (GERD, or heartburn) thought they’d found a true “magic medicine” in new proton pump inhibitor (PPI) drugs.

Since then, PPIs have been FDA-approved for a total of 6 different stomach-related disorders, and by July 2018, about 15 million Americans, annually, used a PPI.25

PPIs were originally meant for episodic (now and again) use—never for the chronic, long-term applications adopted by many men and women.

Now that people have been exposed to PPIs for years, some of the drugs’ darker sides are beginning to emerge. Among them are:

• Reduced nutrient absorption related to lower stomach acid6
• Excessive secretion of the stomach hormone gastrin, associated with cancer promotion26
• Overgrowth of intestinal bacteria related to lower stomach acid levels6,13,27

The study highlighted in this Research Update is a large, controlled evaluation of PPI use specifically in liver cancer patients. Its results should be concerning to anyone who uses PPIs on a regular basis.

Safer Alternatives to Treat Stomach Issues

In 2013, an estimated 15 million Americans used PPIs.15 Considering the association of PPIs with increased incidence of liver cancer—and the tragically high death rate associated with that cancer—it’s wise to consider less potentially harmful alternatives.

Studies have shown that supplements containing deglycyrrhizinated licorice and a zinc-carnosine compound protect the stomach from acid damage, while raft-forming alginates help to protect the esophagus against acid/reflux erosion.16-19

Licorice root and zinc-carnosine are used to treat both ulcers and heartburn, and they actively promote healing of the stomach’s lining. Raft-forming alginates block acids, enzymes, bile and foods from entering the esophagus and causing painful and damaging effects. All 3 supplements have an excellent safety record and have been used for decades to help with stomach and esophagus problems.

Proton pump inhibitors are intended to be used for a short period of time. However, many individuals use them regularly for years, and this creates a challenging dilemma for those with severe esophageal reflux.

If you are considering alternative therapies, do not discontinue PPIs without physician guidance. Discuss and review any alternative therapies with your physician for a successful transition.
Heartburn hurts, and people who suffer from it will try just about anything to get relief. The most common medications available to heartburn sufferers over-the-counter in the U.S., proton pump inhibitors (PPIs), are often used inappropriately, and come with a growing list of potentially adverse effects.

A new and thorough study from the U.K. has shown a shocking increase in liver cancer risk associated with PPI use. That comes on top of previous studies associating PPIs with heart disease, dementia, and kidney disorders, along with the disruption of healthy intestinal bacteria. Caution is clearly advised in pursuing relief through long-term PPI use.

Alternatives to PPIs can be found in flavonoid-rich deglycyrrhizinated licorice extracts, zinc-carnosine, and protective raft-forming alginates. The benefits of all these alternatives are supported by scientific evidence and should be discussed with your physician.

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
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The proper balance of microflora in the intestines is crucial for health and well-being. Jarrow Formulas® probiotic dietary supplements are designed to maintain a healthy balance of these microflora to maximize your digestive and immune system.*

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High Potency Optimized Folate (5,000 mcg)
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New Test Offered for Annual Lab Test Sale

Last year, Life Extension® changed the name of the Blood Test Super Sale to the Annual Lab Test Sale. We made this change because we offer diagnostic tests that go beyond blood tests, including urine, saliva, allergy, and even DNA tests.

In this interview, Dr. Scott Fogle explains the benefits of an innovative new test being offered during this year’s Annual Lab Test Sale.

LE: What new test is being offered this year, Dr. Fogle?

Dr. Fogle: This year we’re offering the Comprehensive Stool Analysis with Parasitology, a test that is growing in popularity with forward-thinking clinicians across the country. It provides actionable information and a deeper insight into a person’s gastrointestinal tract (GI).

LE: Does this have a connection to the growing trend of using prebiotics and probiotics for supporting GI health?

Dr. Fogle: Yes, but it’s important to note that prebiotics and probiotics are beneficial not just for good GI health, but for whole body and mind health. The area of probiotic science is exploding with new research every week, and there are even entire medical/scientific conferences on the topic. Each year we learn more that can help people with GI-related issues, as well as those with conditions that seem to be unrelated.

LE: Why is finding out about gut health so important?

Dr. Fogle: The health of your gut goes far beyond digestion. Around 400 B.C., Hippocrates was credited with saying, “Death sits in the bowels.” He also stated that, “Bad digestion is the root of all evil.” Modern research is bringing those ideas into the 21st century.
In 2011, Jeremy Nicholson, PhD, said that, “Almost every sort of disease has a gut bug connection.” For example, research has connected imbalances in microflora of the gut not just to “leaky gut” but also to “leaky brain,” which occurs when the blood-brain barrier is not as tight and protective as it should be. Gut-health issues have also been tied to hypertension, vascular diseases, diabetes, autoimmunity, inflammation, asthma, eczema, depression, anxiety, fatigue, food sensitivities, and more.

Simply put, gut health is an important part of any program for optimal wellness.

**LE:** We hear a lot about *dysbiosis* nowadays, which is a term indicating imbalances in your intestinal microbes. Does this new test provide information about it?

**Dr. Fogle:** Yes, this test can identify potential dysbiosis to see if there’s not enough good, healthy microflora compared to potentially harmful microflora.

The body needs to be in a balanced state. That concept applies not only to hormones and neurotransmitters, but to your gut microflora as well. If your gut is out of balance, you will not feel your best.

**LE:** Beyond looking at intestinal flora imbalances, what else can this test reveal?

**Dr. Fogle:** The Comprehensive Stool Analysis with Parasitology test looks at digestive and absorptive insufficiencies, inflammation, short-chain fatty acids, mucosal protective secretory IgA immunoglobulin, red blood cells, white blood cells, occult blood, and acidity (pH).

**LE:** Why are short-chain fatty acids important?

**Dr. Fogle:** Few people know about these powerful compounds. The Comprehensive Stool Analysis with Parasitology test identifies the key short-chain fatty acids, which include acetate, propionate, valerate, and butyrate.

Currently, **butyrate** is thought to be the most important short-chain fatty acid. It acts as fuel for the cells lining your GI tract. It mediates microbial-host crosstalk, which means it gives your body instructions on how to keep your GI tract healthy. It regulates mucosal barrier integrity and function which, when lost, set the stage for leaky gut. It also mediates the release of anti-inflammatory cytokines.

All these important functions make short-chain fatty acids key compounds that should be measured periodically in order to maintain optimal bowel health. If the ratios of the different short-chain fatty acids are off, it is an indication that your intestinal microflora balance is off. And if your total short-chain fatty acid level is low, it points to probable dysbiosis.

**LE:** If someone has low short-chain fatty acid levels, what is the best thing that can help?

**Dr. Fogle:** Fiber! That is the fuel which good bacteria use to make short-chain fatty acids. A healthy diet of fruits, vegetables, and complex carbohydrates can provide that fiber. If your diet does not have enough high-fiber foods, it is important to consider adding a prebiotic, which is a type of fiber that feeds good bacteria. I recommend a specialized prebiotic like xylooligosaccharides (XOS) to preferentially feed the good bacteria.

**LE:** How are these microbes cultured to make sure they are identified properly?
Dr. Fogle: Many labs only use 3 different growth conditions. But the lab we partner with uses advanced microbiology testing, which cultivates microbes using 10 different growth conditions. This includes 5 aerobic (including one with enrichment broth for enteric pathogens), 3 anaerobic (for Bifidobacteria, Lactobacilli, Bacteroides, Clostridium etc.), microaerophilic (for low oxygen microbes like Campylobacter), and finally, 170 species of yeast and 65 species of Candida. This advanced yeast and Candida testing is especially appreciated by those concerned about the impact yeast and Candida have on their health.

LE: Does this test check for parasites as well?

Dr. Fogle: Yes. Parasites are all around us, and some people are more susceptible to them than others. The Comprehensive Stool Analysis with Parasitology tests for the main 50 species of parasites, such as Blastocystis hominis, Entamoeba, Giardia, and Cryptosporidium.
Dr. Fogle: The Comprehensive Stool Analysis with Parasitology tests for the presence of red blood cells and occult blood in the stool, which can be connected to something as simple as hemorrhoids or as serious as cancer. Red blood cells in the stool often relate to active bleeding in the lower bowel, such as a hemorrhoid or overstraining during a bowel movement. Occult blood tends to be more of a serious issue as it indicates a problem higher up in the GI tract.

This test also checks pH levels, which can provide information about transit time, which is the time it takes food to move through the GI tract. If a person’s pH is low (meaning the stool is more acidic), and if the consistency of the stool is loose and watery, it likely means food is moving too quickly through the GI tract. In order to determine the underlying cause, a follow-up test, like the Food Safe Allergy Test, can help identify foods or spices to which the body may be responding inappropriately.

A low pH does not provide optimal digestion because the pancreatic enzymes do not work well in acidic conditions. Fast transit time can also affect the microflora of the GI tract, especially if it is an ongoing issue. Because of this, a low pH can be associated with too many bowel movements in a day.

LE: Why do older people seem to struggle with digestion?

Dr. Fogle: It is true that as we age digestion abilities diminish. The same thing happens when we are under stress. Digestion is a lot of work and consumes a lot of energy. As we age and when we are dealing with chronic stress, our bodies produce less energy in the form of adenosine triphosphate (ATP). As a result, we lose digestive power, and it starts to show up in specific markers that can be measured. A similar idea applies to the complex digestive enzymes that come from the pancreas.

LE: What are the digestive markers on this test?

Dr. Fogle: The Comprehensive Stool Analysis with Parasitology test includes several markers of digestion. The first is elastase, which provides information about your pancreas’ ability to make the enzymes needed for good digestion.

The fat stain test reveals your ability to break down and absorb fat. The presence of muscle fibers in the stool indicates incomplete digestion and can correlate with symptoms of bloating, flatulence, and feelings of fullness. It can also hint at poor hydrochloric acid and pepsin production in the stomach. The presence of vegetable fibers in the stool may indicate a lack of proper chewing, which is an important part of digestion. Humans don’t make the cellulose enzymes, and in order to break up the cellulose fibers in plants we must rely on chewing food thoroughly.

High carbohydrates indicate a carbohydrate malabsorption issue since carbohydrates should be easily absorbed in the upper GI tract. If they are present, it indicates probable damage to the microvilli of the small intestine.

LE: Are any other tests included?

Two additional markers, lactoferrin and calprotectin, are increased in inflammatory bowel disease but not in irritable bowel syndrome. They can help differentiate between inflammatory bowel disease (in which case all 3 markers are high), versus pathogen-induced inflammation (where just lysozyme would be high).

LE: What is the most innovative aspect of this test?

Dr. Fogle: The fat stain test reveals your ability to break down and absorb fat.

The presence of muscle fibers in the stool indicates incomplete digestion and can correlate with symptoms of bloating, flatulence, and feelings of fullness. It can also hint at poor hydrochloric acid and pepsin production in the stomach.

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High carbohydrates indicate a carbohydrate malabsorption issue since carbohydrates should be easily absorbed in the upper GI tract. If they are present, it indicates probable damage to the microvilli of the small intestine.
Dr. Fogle: I appreciate all the information this test provides, but if I had to pick one aspect, it would be the sensitivity testing for the pathogens found. If a pathogen is found, the lab tests which medications and natural substances can kill it and those to which the pathogen is resistant.

This allows people to work with their healthcare providers to create targeted, clinical interventions that will be the most efficient at getting rid of specific pathogens. Without sensitivity testing, doctors can only guess at the best course of action.

I’ve found that doctors are much more willing to try natural ingredients after seeing the results of sensitivity testing for pathogens. This can be a big help for people wanting to try an alternative approach to treating their ongoing GI issues.

LE: It is impressive that this one, comprehensive stool analysis yields so much information.

Dr. Fogle: It really is an amazing amount of information. Our senior wellness specialists here at Life Extension can help provide information on how to create a wellness plan based on the results of the test. In more serious situations, they can provide information that will help you have a meaningful and productive conversation with your healthcare provider in order to be able to create a targeted, clinical intervention plan.

The bottom line is that we want people to have powerful information they can use to promote their vital health and longevity, and the Comprehensive Stool Analysis with Parasitology test helps accomplish that goal.

To order the Comprehensive Stool Analysis w/Parasitology x1 test, call 1-800-208-3444 or visit www.LifeExtension.com

Dr. Scott Fogle is the Executive Director of Clinical Information and Laboratory Services at Life Extension®, where he oversees scientific and medical information as well as its laboratory division.

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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In his new book, *EAT TO BEAT DISEASE: The New Science of How Your Body Can Heal Itself*, William W. Li, M.D. focuses on how food can be used as medicine to prevent and even treat disease.

Dr. Li’s interest in preventing and curing disease began with his work on angiogenesis, or the creation of new blood vessels.

Early in his career, he studied how angiogenesis helps cancer thrive by supplying it with nourishing blood. Before long, he and other researchers realized that angiogenesis isn’t just a factor in cancer.

In fact, angiogenesis is a player in a huge range of diseases, including heart disease, stroke, diabetes, Alzheimer’s, obesity, and more. Controlling blood vessel formation, therefore, might prevent many diseases.

This thinking led Dr. Li to look at the underlying causes of disease—and how to treat or eliminate them by having people activate their body’s own health defense systems.

Dr. Li is a graduate of Harvard College and the University of Pittsburgh School of Medicine. He is well known for his TED Talk, “Can We Eat to Starve Cancer?” which has garnered more than 11 million views to-date. Dr. Li has also appeared on “The Dr. Oz Show,” CNN and NPR, and has published articles in journals including the *New England Journal of Medicine* and *The Lancet*.

In this exclusive Life Extension® interview, Dr. Li discusses the five major defense systems humans rely on to prevent disease and how a healthy diet can support each one.

—JON VANZILE
LE: In your book, you’ve identified five “defense systems” that help protect people from birth until old age. What are they and how do they work?

Dr. Li: When I teach about diet and health, I use the analogy that the body is like a medieval fortress, protected by a host of clever defenses that heal the body from within. The five defense systems I’m referring to are angiogenesis, regeneration, the microbiome, DNA protection, and immunity.

LE: We write a lot about how nutrients can support these systems in Life Extension Magazine®. Let’s take them one by one. First, angiogenesis—how does it support health?

Dr. Li: Inside you, there are about 60,000 miles of blood vessels whose job it is to deliver oxygen and nutrients to cells. Angiogenesis is the process of creating new blood vessels. If you’ve ever scraped your knee badly enough to bleed and form a scab, and if that scab was pulled off too early, you have seen angiogenesis unfolding before your eyes. In the area under the scab, which is bright red and glistening, thousands of new blood vessels were growing in the wound to restore the injured tissue. Their growth is stimulated by angiogenic growth factors that are released as soon as the injured tissue begins to bleed. These angiogenic growth factors stimulate blood vessels to start sprouting and forming tubes. The new tubes become capillaries and eventually new vessels.

The angiogenesis defense system constantly senses where and when more vessels are needed to keep organs healthy and functioning, so control over angiogenesis needs to be perfect to optimize health. Unfortunately, over the course of a lifetime, many factors can derail this defense and encourage many diseases. In cancer, for example, some cancers release huge amounts of the same growth factors involved in wound healing. Once the blood vessels sprout into the small cluster of cancer cells, a tumor can grow exponentially. Other diseases encouraged by improper angiogenesis include inflammatory conditions such as autoimmune diseases, age-related macular degeneration, psoriasis, and even obesity.

LE: Let’s talk about regeneration. What is it?

Dr. Li: Regeneration is the process by which old, worn out tissues are naturally replenished by new tissues. This is crucial to grow and maintain your organs. Regeneration relies on stem cells, which are immature, pluripotent cells that can form any organ in the body. We know they are vital during fetal formation, but they also play a critical role throughout adult life, quietly regenerating most organs as we age. Besides aging, stem cells are also vulnerable to common factors that assault our bodies throughout life, including tobacco smoke, alcohol, air pollution, high blood cholesterol, and others.

LE: Next up is the microbiome. We hear a lot about how probiotics can help support a healthy microbiome, or gut flora. Can you explain how the microbiome is a critical element in protecting against disease?

Dr. Li: In this age of ever-expanding identities, here’s a new one. You are no longer simply human—you’re a “holobiont.” Technically, this means you are an organism that functions as an assemblage of multiple species that are mutually beneficial. In this case, that means your body is actually a
A strong immune system not only helps you avoid the common cold, it can also protect you against cancer. Our immune system is one of the best-known health-defense systems. It fights off bacteria and viruses, and prevents us from getting sick. But if your immune system is weakened and unable to do its job, you are vulnerable. Today, we’re learning to harness the incredible power of the immune system to help defeat diseases like cancer with immunotherapy. New research is showing that food, too, can powerfully influence our immune defenses.

LE: The fourth defense system you write about is DNA defense. How does this one work?

Dr. Li: Your DNA is the source code that keeps you alive and healthy. Unfortunately, DNA is quite fragile. Every day, your DNA sustains more than 10,000 naturally occurring, damaging events. This ranges from breaks in the strand that occur as a matter of chance, side effects from destructive processes like inflammation, or the result of toxic chemicals we breathe in, eat, or absorb. Whatever way it happens, each error has the potential to derail our DNA and wreak havoc on our health.

LE: So, how can eating a healthful diet support our DNA?

Dr. Li: Antioxidants are desirable substances that neutralize free radicals and protect your cells. Many foods contain bioactive chemicals with antioxidant properties. For example, vitamin C, found in citrus or kiwi, is a popular vitamin with antioxidant properties. But protecting your DNA with antioxidants from food is only one part of protecting your genetic code. Other foods can trigger additional protective health defenses that are naturally hardwired in our DNA. These foods switch certain genes “on” or “off.”

LE: The last defense you mention is our immune system, which seems closely related to many of the concepts we’ve already discussed. Can you explain why a healthy immune system is so critical?
Dr. Li: Every single day, you are making choices that can tilt the odds in your favor for living longer and better, without illness. My approach isn’t based on elimination, restriction, or deprivation, but rather, it is based on eating the foods you like best. In my book, I’ve developed something called the 5x5x5 framework that will help you eat to beat disease. In simple terms, it’s a strategy to support the five health-defense systems by eating up to five times a day and incorporating a minimum of five health-supporting foods into the meals and snacks you already eat. This is not a weight-loss plan and it’s not a prescription. It’s an adaptable framework to whatever diet plan you’re currently following, or it works if you don’t follow a plan at all.

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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To order a copy of Eat to Beat Disease: The New Science of How Your Body Can Heal Itself call 1-800-544-4440 or visit www.LifeExtension.com

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References
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Key Markers of this panel have been grouped into 6 actionable areas: Digestion/Absorption, Microbiome health, Inflammation, Immune Response, Intestinal Health Markers, Infection and Pathogenic bacteria, yeast and Parasites. Antimicrobial susceptibility testing is also performed when appropriate to facilitate treatment.

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<tr>
<td><strong>FOOD SAFE ALLERGY TEST – EXTENDED</strong> (LCM73002)</td>
<td>$264</td>
<td>$148.50</td>
</tr>
<tr>
<td>This test measures delayed (IgG) food allergies to an additional 95 foods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FOOD SAFE ALLERGY TEST – COMBO</strong> (LCM73003)</td>
<td>$500</td>
<td>$281.25</td>
</tr>
<tr>
<td>This test measures delayed (IgG) food allergies to all 190 foods found in our Basic and Extended panels.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### WHOLE BODY HEALTH

<table>
<thead>
<tr>
<th>Panel Description</th>
<th>Retail Price</th>
<th>Super Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MALE ELITE PANEL (LC100016)</strong></td>
<td>$766.66</td>
<td>$431.25</td>
</tr>
<tr>
<td>CBC/Chemistry Profile - Free and Total Testosterone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Estrogens - Estradiol - DHEA-S - Progesterone - Pregnenolone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHT - FSH - LH - TSH - Free T3 - Free T4 - Reverse T3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Free and Total PSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGF-1 - SHBG - Vitamin D 25-OH - hs-CRP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ferritin - Homocysteine - Insulin - Hemoglobin A1c - Cortisol - ApoB</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MALE COMPREHENSIVE HORMONE PANEL (LC100010)</strong></td>
<td>$398.66</td>
<td>$224.25</td>
</tr>
<tr>
<td>CBC/Chemistry Profile - DHEA-S, Estradiol - DHT - PSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnenolone - Total and Free Testosterone - SHBG - TSH - Free T3</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MALE BASIC HORMONE PANEL (LC100012)</strong></td>
<td>$100</td>
<td>$56.25</td>
</tr>
<tr>
<td>DHEA-S - Estradiol - Total and Free Testosterone - PSA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>INSULIN FASTING (LC004333)</strong></td>
<td>$39.87</td>
<td>$24.42</td>
</tr>
<tr>
<td>Helpful to assess insulin resistance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>NMR LIPOPROFILE</strong> (LC123810)</td>
<td>$132</td>
<td>$74.25</td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ADVANCED OXIDIZED LDL PANEL</strong> (LC100035)</td>
<td>$380</td>
<td>$213.75</td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### CBC/Chemistry Profile

*These CBC/Chemistry tests are included in the popular Male and Female Panels, and other panels on this page so you don’t have to order them separately.*

<table>
<thead>
<tr>
<th>Panel Description</th>
<th>Retail Price</th>
<th>Super Sale Price</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CARDIOVASCULAR RISK</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cholesterol - HDL Cholesterol - LDL Cholesterol - Triglycerides Cholesterol/HDL Ratio - Estimated CHD Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LIVER FUNCTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AST (SGOT) - ALT (SGPT) - LDH - Total Bilirubin - Alkaline phosphatase</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>KIDNEY FUNCTION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUN - Creatinine - BUN/Creatinine Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLOOD PROTEINS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Protein - Albumin - Globulin - Albumin/Globulin Ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLOOD COUNTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red Blood Cell Count - White Blood Cell Count - Eosinophils Neutrophils (Absolute) - Lymphs (Absolute) - Eos (Absolute) - Baso (Absolute) RDW - Monocytes (Absolute) - Monocytes - Lymphocytes - Platelet Count Hemoglobin - Hematocrit - MCV - MCH - MCHC - Neutrophils</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BLOOD MINERALS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium - Potassium - Sodium - Chloride - Iron</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The retail price for the CBC/Chemistry Profile alone is **$47**, but drops to **$26** during the Blood Test Super Sale. (LC381822)

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

**With Your Healthy Rewards, you earn LE Dollars back on every purchase you make — including blood tests! For details, see www.LifeExtension.com/Rewards**
7 TRAGEDY OF DELAYED PREVENTION
Even slightly elevated blood glucose or hemoglobin A1c increases disease risk. Comprehensive blood testing can detect elevated glycemic markers that are reversible.

36 SEASONAL ALLERGIES
A specific probiotic combined with fermented yeast resulted in 43% fewer days with nasal congestion and a 31% reduction in eye symptoms.

56 OVERLOOKED DANGER OF EXCESS INSULIN
A simple blood test can identify elevated fasting insulin, which is linked to cancer, Alzheimer’s, and atherosclerosis.

26 MAXIMIZE GREEN TEA BENEFITS
A novel green tea extract provides 8 different catechins—the equivalent of up to 12 cups of standard green tea daily.

46 TAURINE PROTECTS MATURING BRAINS
An amino acid called taurine spurs the growth of new brain cells, even in old age.

66 AGE-REVERSAL UPDATE
The Age-Reversal Network plans to launch a clinical trial this year to begin testing a series of regenerative interventions.