With age, synapses that connect our brain cells wither.

Formulated by MIT scientists, Neuro-Mag® Magnesium L-Threonate has been shown to improve synaptic density and other structural components of the brain.


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In human studies, two compounds **stabilized or even reversed** signs of cognitive dysfunction in people with early cognitive impairment and Alzheimer’s.
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100 mg CoQ10  
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200 mg CoQ10  
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Q+, Kaneka Ubiquinol™, and the quality seal™ are registered or pending trademarks of Kaneka Corp.  

MEDICAL ADVISORY BOARD

Gustavo Tovar Baez, MD, operates the Life Extension Clinic in Caracas, Venezuela. He is the first physician in Caracas to specialize in anti-aging medicine.

Ricardo Bernardes, MD, is a board-certified pediatrician and general practitioner in Chicago, IL, focusing on allergies, bronchial asthma, and immunodeficiency.

Mark S. Bezek, MD, FACP, FAARM, FAAEM, is board-certified in internal medicine, emergency medicine, and anti-aging/regenerative medicine. He is the director of Med-Link Consulting, which specializes in bioidentical hormone replacement therapy, natural alternatives, anti-aging, and degenerative diseases. He holds U.S. patents for a multivitamin/mineral supplement, an Alzheimer’s/dementia compilation, and a diabetic regimen.

Thomas F. Crais, MD, FACS, a board-certified plastic surgeon, was medical director of the microsurgical research and training lab at Southern Baptist Hospital in New Orleans, LA, and currently practices in Sun Valley, ID.

William Davis, MD, is a preventive cardiologist and author of Wheat Belly: Lose the Wheat, Lose the Weight and Find Your Path Back to Health. He is also medical director of the online heart disease prevention and reversal program, Track Your Plaque (www.trackyourplaque.com).

Martin Dayton, MD, DO, practices at the Sunny Isles Medical Center in North Miami Beach, FL. His focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.

John DeLuca, MD, DC, is a 2005 graduate of St. George’s University School of Medicine. He completed his internal medicine residency at Monmouth Medical Center in Long Branch, NJ, in 2008 and is board-certified by the American Board of Internal Medicine. Dr. DeLuca is a Diplomate of the American Academy of Anti-Aging Medicine and has obtained certifications in hyperbaric medicine, pain management, nutrition, strength and conditioning, and manipulation under anesthesia.

Sergey A. Dzugan, MD, PhD, was formerly chief of cardiovascular surgery at the Donetsk Regional Medical Center in Donetsk, Ukraine. Dr. Dzugan’s current primary interests are anti-aging and biological therapy for cancer, cholesterol, and hormonal disorders.

Patrick M. Fratellone, MD, RH, is the founder and executive medical director of Fratellone Associates. He completed his internal medicine and cardiology fellowship at Lenox Hill Hospital in 1994, before becoming the medical director for the Atkins Center for Complementary Medicine.

Norman R. Gay, MD, is proprietor of the Bahamas Anti-Aging Medical Institute in Nassau, Bahamas. A former member of the Bahamian Parliament, he served as Minister of Health and Minister of Youth and Sports.

Mitchell J. Ghen, DO, PhD, holds a doctorate in holistic health and anti-aging and serves on the faculty of medicine at the Benemerita Universidad Autonoma De Puebla, Mexico, as a professor of cellular hematopoietic studies.

Gary Goldfaden, MD, is a clinical dermatologist and a lifetime member of the American Academy of Dermatology. He is the founder of Academy Dermatology of Hollywood, FL, and COSMESIS Skin Care.

Miguelangelo Gonzalez, MD, is a certified plastic and reconstructive surgeon at the Miguelangelo Plastic Surgery Clinic, Cabo San Lucas.

Garry F. Gordon, MD, DO, is a Payson, Arizona-based researcher of alternative approaches to medical problems that are unresponsive to traditional therapies. He is president of the International College of Advanced Longevity Medicine.

Richard Heifetz, MD, is a board-certified anesthesiologist in Santa Rosa, CA, specializing in the delivery of anesthesia for office-based, plastic/cosmetic surgery, chelation therapy, and pain management.

Roberto Marasi, MD, is a psychiatrist in Brescia and in Piacenza, Italy. He is involved in anti-aging strategies and weight management.

Maurice D. Marholin, DC, DO, is a licensed chiropractic physician and board-certified osteopathic family physician. While training at the University of Alabama, he completed fellowships in Clinical Nutrition and Behavioral Medicine. He is currently in private practice in Clermont, FL.

Professor Francesco Marotta, MD, PhD, of Montenapoleone Medical Center, Milan, Italy, is a gastroenterologist and nutrigenomics expert with extensive international university experience. He is also a consulting professor at the WHO-affiliated Center for Biotech & Traditional Medicine, University of Milano, Italy and honorary resident professor, Nutrition, Texas Women’s University. He is the author of more than 130 papers and 400 lectures.

Philip Lee Miller, MD, is founder and medical director of the Los Gatos Longevity Institute in Los Gatos, CA.

Michele G. Morrow, DO, FAAFP, is a board-certified family physician who merges mainstream and alternative medicine using functional medicine concepts, nutrition, and natural approaches.

Filippo Ongaro, MD, is board-certified in anti-aging medicine and has worked for many years as flight surgeon at the European Space Agency. He is a pioneer in functional and anti-aging medicine in Italy where he also works as a journalist and a writer.

Lambert Titus K. Parker, MD, an internist and a board-certified anti-aging physician, practices integrative medicine from a human ecology perspective with emphasis on personalized brain health, biomarkers, genomics and total health optimization. He serves as the Medical Director of Integrative Longevity Institute of Virginia, a 501(c)3 Non-Profit Medical Research Institute. He also collaborates on education and research for Hampton Roads Hyperbaric Therapy.

Ross Pelton, RPh, PhD, CCN, is scientific director for Essential Formulas, Inc.

Patrick Guillin, PhD, RD, CNS, is a clinical nutritionist in Carlsbad, CA, and formerly served as vice president of nutrition for Cancer Treatment Centers of America, where he was a consultant to the National Institutes of Health.

Allan Rashford, MD, graduated from the University of Iowa Medical School. Upon completing medical training, he became chief of medicine at St. Francis Hospital in South Carolina, and he was later named president of the Charleston Medical Society.

Marc R. Rose, MD, practices ophthalmology in Los Angeles, CA, and is president of the Rose Eye Medical Group. He is on the staff of Pacific Alliance Medical Center, Los Angeles, and other area hospitals.

Michael R. Rose, MD, a board-certified ophthalmologist with the Rose Eye Medical Group in Los Angeles, CA, is on the staff of the University of Southern California and UCLA.

Ron Rothenberg, MD, is a full clinical professor at the University of California San Diego School of Medicine and founder of California HealthSpan Institute in San Diego.

Roman Rozencwaig, MD, is a pioneer in research on melatonin and aging. He practices in Montreal, Canada, as research associate at Montreal General Hospital, Department of Medicine, McGill University.

Michael D. Seidman, MD, FACS, is the director of skull base surgery and wellness for the Adventist Health System in Celebration, FL.

Ronald L. Shuler, BS, DDS, CCN, LN, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. He is board-certified in anti-aging medicine.
Sandra C. Kaufmann, MD, is a fellowship-trained and board-certified pediatric anesthesiologist as well as the Chief of Anesthesia at the Joe DiMaggio Children’s Hospital in Hollywood, Florida. She is the founder of The Kaufmann Anti-Aging Institute and the author of the book The Kaufmann Protocol: Why we Age and How to Stop it (2018). Her expertise is in the practical application of anti-aging research.

Richard Black, DO, is a dedicated nuclear medicine physician practicing as an independent contractor out of Cleveland, Ohio. Dr. Black is board-certified in internal medicine and nuclear medicine, and is licensed to practice medicine in multiple states throughout the United States.

John Boik, PhD, is the author of two books on cancer therapy, Cancer and Natural Medicine (1996) and Natural Compounds in Cancer Therapy (2001). He earned his doctorate at the University of Texas Graduate School of Biomedical Sciences with research at the MD Anderson Cancer Center, focusing on screening models to identify promising new anti-cancer drugs. He conducted his postdoctoral training at Stanford University’s Department of Statistics.

Aubrey de Grey, PhD, is a biomedical gerontologist and Editor-in-Chief of Rejuvenation Research, the world’s highest-impact, peer-reviewed journal focused on intervention in aging. He received his BA and PhD from the University of Cambridge in 1985 and 2000 respectively. Dr. de Grey is a Fellow of both the Gerontological Society of America and the American Aging Association and sits on the editorial and scientific advisory boards of numerous journals and organizations.

Deborah F. Harding, MD, is founder of the Harding Anti-Aging Center. She is double board-certified in internal medicine and sleep disorder medicine. She also earned the Ceregeneics certification in age management medicine. She is a faculty member of the University of Central Florida Medical School.

Steven B. Harris, MD, has participated in ground-breaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.

Peter H. Langsjoen, MD, FACC, is a cardiologist specializing in congestive heart failure, primary and statin-induced diastolic dysfunction, and other heart diseases. A leading authority on coenzyme Q10, Dr. Langsjoen has been involved with its clinical application since 1983. He is a founding member of the executive committee of the International Coenzyme Q10 Association, a fellow of the American College of Cardiology, and a member of numerous other medical associations.

Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath., FACP, is the Medical Director of the Maharaj Institute of Immune Regenerative Medicine, and is regarded as one of the world’s foremost experts on adult stem cells. He received his medical degree in 1978 from the University of Glasgow Medical School, Scotland. He completed his internship and residency in Internal Medicine and Hematology at the University’s Royal Infirmary.

L. Ray Matthews, MD, FACS, is a professor of surgery and director of Surgical Critical Care at Morehouse School of Medicine in Atlanta, GA, and a trauma and critical care surgeon at Grady Memorial Hospital. He has published widely and is known as one of the top vitamin D experts. Dr. Matthews has spoken before the U.S. Food and Drug Administration several times, presenting a recent update about clinical research on vitamin D.

Ralph W. Moss, PhD, is the author of books such as Antioxidants Against Cancer, Cancer Therapy, Questioning Chemotherapy, and The Cancer Industry, as well as the award-winning PBS documentary The Cancer War. Dr. Moss has independently evaluated the claims of various cancer treatments and currently directs The Moss Reports, an updated library of detailed reports on more than 200 varieties of cancer diagnoses.

Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of Heart Attacks Are Not Worth Dying For, The Great American Heart Hoax, and The Complete Mediterranean Diet. For more information visit www.DrOzner.com.

Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Tukwila, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored or co-authored 14 books, selling more than 1.5 million copies.

Xiaoxi Wei, PhD, is a chemist, expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.
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BioActive Complete B-Complex provides enzymatically active forms of meaningful potencies of each B vitamin.

This includes the pyridoxal 5'-phosphate form of vitamin B6 shown to protect lipids and proteins against glycation and the most biologically active form of folate called 5-methyltetrahydrofolate (5-MTHF), which is up to 7 times more bioavailable than folic acid.*

Item #01945 • 60 vegetarian capsules
1 bottle $9 • 4 bottles $8 each

Caution: Temporary flushing, itching, rash, or gastric disturbances may occur.

In other words, glucose and A1c may appear “normal” on blood test results. But without testing fasting insulin, this may create a false sense of security by not recognizing that the “excess” insulin is helping to keep glucose and A1c within acceptable ranges.11

Before full-blown type II diabetes manifests, suboptimal glycemic control is associated with increasing risks of the most common diseases12 of aging.13-16

Further, worsening glycemic control can silently contribute to diabetes, leading to peripheral nerve damage (neuropathy), chronic kidney disease, and/or loss of vision (retinopathy).17

Newly diagnosed diabetics often ask why so many morbidities afflict them so quickly. The answer is these pathologies were festering for years as a result of suboptimal metabolic control, which could have been identified earlier with proper blood tests.

Some studies have shown that fasting insulin levels are a more accurate predictor of cardio-metabolic risk, compared to tests for insulin resistance.18,19

One of the most serious global health problems today is metabolic disorders related to obesity and insulin resistance.20,21 Effective methods (diet and exercise) can slow or halt progression to type II diabetes—but prevention is critical.

That’s why it’s essential to include fasting insulin with glucose and A1c blood testing to get a more accurate understanding of your glycemic status.

### Why We Test Insulin Blood Levels

Customers who order our blood test panels often ask why we measure fasting insulin.

One reason is that higher fasting insulin levels are correlated with lower life expectancy1 and increased risks of cancer2-5 and cardiovascular disorders.6-8

Insulin production is regulated by blood sugar levels and hormones. Fasting insulin increases in response to insulin resistance.9,10

At first, higher insulin levels can initially help drive glucose out of the blood into cells.10

As insulin resistance worsens, even greater insulin secretion fails to adequately normalize blood glucose.10

A missed opportunity for early diagnosis occurs when fasting insulin is omitted from blood panels that measure glucose and A1c.

Higher levels of insulin can temporarily reduce glucose and A1c in a way that masks glycemic control issues.10

### Know Your GLYCEMIC BLOOD MARKERS

<table>
<thead>
<tr>
<th>Target Interventions to Achieve:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting Glucose → 80 to 86 mg/dL</td>
</tr>
<tr>
<td>Fasting Insulin → &lt;5 μIU/mL</td>
</tr>
<tr>
<td>Hemoglobin A1c → 5.0 to 5.4%</td>
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</tbody>
</table>

![WILLIAM FALOON](image)
Type II diabetes is surging higher worldwide among all age groups.

The Centers for Disease Control and Prevention is running public service ads (one copied on this page) warning that one in three American adults is at risk for prediabetes.20

The term “prediabetes” can be misleading.

Few realize that the initial stages of glucose imbalance inflict severe tissue damage. This happens before full-blown type II diabetes is officially diagnosed.16

These pathologies are not limited to adults. There was an astounding 95% increase in Americans under age 20 living with type II diabetes between 2001-2017.22

Need for Early Intervention

Most cases of type II diabetes begin when cells slowly become resistant to insulin.20

When this occurs, glucose buildup in blood causes the pancreas to secrete higher levels of insulin to force glucose into cells. This temporarily helps compensate for insulin resistance in target tissues (e.g., skeletal, muscle, liver).

During the period of insulin resistance, weight gain may be an outward sign of loss of glycemic control. This happens as elevated levels of glucose + insulin contribute to unwanted fat storage.1,23

Weight gain and physical inactivity increase the risk of developing insulin resistance.20

As insulin resistance worsens, insulin levels often rise as the pancreas attempts to compensate and literally force glucose into target tissues that have become resistant to the action of insulin at a cellular level.1

If a blood test reveals high fasting insulin before glucose and A1c become elevated, this provides an opportunity to identify diabetes earlier in the process, before extensive damage occurs.

Published data suggest elevated fasting insulin can be a useful diagnostic tool for identifying early-stage insulin resistance.24

One study found insulin resistance to be the most important predictive risk factor in the development of coronary artery disease.25

Other studies recognize the prognostic value of fasting insulin and suggest that hyperinsulinemia (high fasting insulin) is often both a result and a driver of insulin resistance.16

A consistent association exists between hypertension (high blood pressure) and elevated insulin.26

Mechanistic factors have been identified to explain why tissue damage associated with “excess” insulin and insulin resistance causes blood pressure to spike.27
Kidney Damage

Chronic kidney disease is surging, coinciding with an increased prevalence of obesity, hypertension, and diabetes.

Insulin resistance and hypertension predispose to premature atherosclerosis and other pathologies that contribute to chronic kidney disease.

Cardiometabolic syndrome, a constellation of metabolic dysfunction characterized by insulin resistance, impaired glucose tolerance, dyslipidemia, hypertension, and intra-abdominal obesity) is associated with an increase in cardiovascular disease and kidney failure.

Recognition of the role of insulin resistance and hyperinsulinemia in cardiometabolic syndrome provides a rationale to measure fasting insulin blood levels.

Based on the currently available data, we believe that fasting insulin above 5 μIU/mL is likely suboptimal. Steps that can be taken to improve metabolic health include a healthy, plant-based diet low in simple sugar, processed animal products, and saturated fat, and high in nutrients that help support metabolic health.

Physical activity is also important for metabolic health.

Along with these lifestyle changes, and if appropriate for an individual based upon his/her unique health needs, the use of medications under a physician’s care, including metformin and/or an SGLT2 inhibitor like Jardiance® can further improve metabolic health before full-blown type II diabetes manifests.

Advanced-stage kidney disease is currently irreversible. Identifying causative risk factors early with blood tests that include fasting insulin can enable one to take corrective actions in time.

Cancer

Insulin has direct and indirect effects on cancer cell progression, proliferation, and metastasis.

Studies investigating the association between hyperinsulinemia and cancer-related mortality have been inconsistent. Reasons might include the upper-limit reference range used to define hyperinsulinemia.

For example, the standard reference range for fasting insulin begins at 2.6 μIU/mL and extends to a startling high of 24.9 μIU/mL.

Life Extension® long ago urged readers to target fasting insulin below 7.0 μIU/mL with optimal fasting insulin below 5.0 μIU/mL.

Today’s laboratory reference ranges don’t define hyperinsulinemia until fasting insulin rises above 24.9 μIU/mL. This is 3-to-5-times higher than what we consider optimal.

A study found lung cancer incidence doubled in men in the highest quartile of fasting insulin compared to those in the lowest insulin quartile. The conclusions from this study were:

"Higher fasting serum insulin concentrations, as well as the presence of insulin resistance, appear to be associated with an elevated risk of lung cancer."

A gender-based subgroup analysis of seven different studies found significant association between fasting insulin and cancer mortality. The risk of cancer mortality in men with high insulin levels is almost double as compared to those having lower fasting insulin levels.

Ignorance regarding “optimal” fasting insulin levels might be obscuring the impact of high, but “normal” insulin resistance markers on cancer risk and overall cancer mortality.

Factors that Predict Global Diabetes Mellitus and CVD risk.

Age, Genetics, Insulin Resistance Syndrome, Lipids, BP, Glucose, Overweight / Obesity, Abnormal Lipid Metabolism, LDL or ApoB, HDL, Triglycerides, Smoking, Physical Inactivity, Inflammation, Hypercoagulation, Elevated Blood Pressure, Age, Race, Sex, Family History. 
Hyperinsulinemia is sometimes defined as:46

“The amount of insulin in blood being higher than considered normal.”

With laboratory reference ranges defining “normal” as high as 24.9 uIU/mL, doctors who test fasting insulin may not realize the risks in patients with higher than optimal insulin levels.

We believe fasting insulin levels above 5.0-7.0 uIU/mL may indicate cellular insulin resistance, yet today’s laboratory reference ranges define normal as between 2.6 and 24.9 uIU/mL.

A better definition of hyperinsulinemia is a condition in which:

“There are excess levels of insulin circulating in the blood relative to glucose.”

Even this definition can make interpretation of blood test results challenging since the majority of Americans today are overweight and prone to large fluctuations in fasting glucose and insulin levels.

Even thin people can suffer from insulin resistance, which is another reason for testing blood for fasting insulin.

A mass education program about insulin resistance is urgently needed, along with knowledge that it can be detected early by properly interpreting fasting insulin, glucose and A1c blood test results.

What you can do today!

Insulin resistance can be reversed by aggressive dietary and lifestyle changes, including increases in physical activity.40,49-54

Nutrients with glucose-lowering effects can help in combination with diet and more physical activity. For some this is not enough, and for these individuals, medications like metformin and/or an SGLT2

Hyperinsulinemia and Cancer

A massive review article (369 references) published in 2021 describes the health risks and mechanistic dangers of excess insulin.46

What follows is an excerpt from this review titled: “Hyperinsulinemia in Obesity, Inflammation and Cancer”:

“Hyperinsulinemia was associated with a 2-fold risk of cancer death.47 This increase of cancer mortality is also observed in people with normal body weight if they had hyperinsulinemia.48 Therefore, hyperinsulinemia is associated with increased risk of both cancer incidence and death. However, unlike hyperglycemia, there is no widely accepted insulin concentration to define hyperinsulinemia, so it is difficult to compare across studies. Nevertheless, the rationale to study the contribution of hyperinsulinemia to cancer is strong.”

Hyperinsulinemia is a risk factor for other diseases.

Excess insulin and insulin resistance cause deleterious changes in many biochemical pathways that can lead to a number of degenerative diseases and potentially life-threatening metabolic consequences.
inhibitor may also be needed to optimize metabolic health. SGLT2 inhibitors are sold under brand names that include Jardiance®, Farxiga®, Invokana® and others.

An AMPK-activating drug called metformin improves insulin sensitivity and can reduce fasting insulin levels indirectly, largely as a result of improvement in peripheral insulin sensitivity at the cellular level.49,55

**Sodium-Glucose Co-Transporter 2 inhibitor** (SGLT2 inhibitor) drugs increase urinary excretion of glucose from blood. This drug class helps reduce the progression of chronic kidney disease in patients with type II diabetes and reduces adverse cardiovascular outcomes in many of these patients.56

Some studies show SGLT2 inhibitors reduce fasting insulin, likely a result of the reduction of excess blood glucose.57-59

The first step, however, is blood tests that measure glucose, A1c and fasting insulin.

We suggest you target:

- **Fasting Glucose** between 80-86 mg/dL
- **Hemoglobin A1c** between 5.0%-5.4%
- **Fasting Insulin** < 5 μIU/mL

While these numbers are not achievable by everyone, you can at least lower them to safer ranges by initiating steps to improve glycemic status.

A popular blood test panel outlined on the next page includes A1c, glucose, fasting insulin, lipids, C-reactive protein, and other measures.

Commercial labs charge about $2,000 for these tests, but once a year we discount the popular Male and Female Panels down to $224.

You can order these tests 24 hours/day by calling 1-800-208-3444 or visiting www.LifeExtension.com/bloodtests.

I hope this editorial explains why fasting insulin is included in many of our comprehensive blood test panels.

The article on page 24 of this issue describes an easy-to-take fiber approved by the FDA in 2020. One of the benefits found with this soluble plant fiber is reduced glucose and insulin blood levels.

For longer life,

William Faloon, Co-Founder LifeExtension®
References

To obtain these extensive Male or Female Panels at these low prices, call 1-800-208-3444 or visit www.LifeExtension.com/bloodtests to order your requisition forms.

After you order and receive our form, you can visit a blood-draw facility we suggest at your convenience in your area or the Life Extension Nutrition Center in Ft. Lauderdale.

Lab tests are available in the continental United States and Anchorage, AK, only. Not available in Maryland.

Restrictions apply in MA, NY, NJ, and RI. Kits not available in PA. The Lab Test Sale expires on July 10, 2023.
# Annual Lab Test Sale

**Through July 10, 2023**

**1-2-3 EASY**

**How it works:**

**ORDER**
Call 1-800-208-3444 toll-free or visit www.LifeExtension.com/bloodtests

**DRAW**
For your blood draw, bring the requisition we send you to your nearest LabCorp location. Nearest locations are included with your requisition papers.

At-Home tests (denoted by **) are collected in the convenience of your home.

**REVIEW**
Go over results for free with our Wellness Specialists by calling 1-800-226-2370. You may wish to review them with your doctor as well.

### IT’S THAT SIMPLE!
**DON’T DELAY! CALL TODAY!**

For Our Local Customers:
For those residing in the Ft. Lauderdale, Florida, area, blood draws are also performed at the Life Extension Nutrition Center from 9 a.m. to 2 p.m. Monday through Saturday.

Simply purchase the blood test and have it drawn with no wait! Our address is:

**900 NORTH FEDERAL HIGHWAY**  
**FT. LAUDERDALE, FL, 33304**

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

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**PRICE**

#### MALE AND FEMALE PANELS

- **MALE PANEL (LC322582)**  
  CBC/Chemistry/Lipids Panel • DHEA-S • PSA (prostate-specific antigen)  
  • Homocysteine • C-Reactive Protein (high sensitivity) • ApoB • Free Testosterone • Total Testosterone • Estradiol • TSH for thyroid function  
  • Vitamin D (25-hydroxyvitamin D) • Hemoglobin A1c • Insulin • Magnesium  
  **Price: $224**

- **FEMALE PANEL (LC322535)**  
  CBC/Chemistry/Lipids Panel • DHEA-S • Estradiol • Homocysteine • ApoB  
  • C-Reactive Protein (high sensitivity) • Progesterone • Free Testosterone  
  • Total Testosterone • TSH for thyroid function • Vitamin D (25-hydroxyvitamin D)  
  • Hemoglobin A1c • Insulin • Magnesium  
  **Price: $224**

#### CARDIAC RISK ASSESSMENTS

- **NMR LIPOPROFILE® (LC123810)**  
  The NMR LipoProfile® directly measures LDL particle size and number as well as HDL particle number, total cholesterol, and triglycerides. It also provides a calculation of one’s risk of insulin resistance by assessing abnormalities in lipoprotein markers.  
  **Price: $74.25**

- **NMR LIPOPROFILE PLUS* (LC100049)**  
  In-depth analysis of cardiovascular risk markers including: NMR LipoProfile, C- Reactive Protein, Myeloperoxidase, and Oxidized LDL.  
  **Price: $201.75**

- **OXIDIZED LDL (LC123023)**  
  Oxidized low-density lipoprotein (LDL) cholesterol is one of the main causes of the formation of atherosclerotic plaque in the arterial wall. This blood test measures levels of oxidized LDL.  
  **Price: $56.25**

- **MYELOPEROXIDASE (MPO)* (LC123006)**  
  The myeloperoxidase (MPO) test measures levels of an enzyme that oxidizes low-density lipoprotein (LDL) cholesterol, which could lead to increased arterial plaque formation.  
  **Price: $74.25**

- **ADVANCED OXIDIZED LDL PANEL* (LC100035)**  
  This panel looks at vascular inflammatory biomarkers, beginning with lifestyle choices to the development of metabolic and cardiovascular disease as well as the formation of vulnerable plaque. The panel contains the following tests: F2-Isoprostanes, Myeloperoxidase, and Oxidized LDL.  
  **Price: $198.75**

- **OMEGA-3 INDEX COMPLETE**  
  Beneficial for everyone! People not taking omega-3/fish oil should check their baseline Omega-3 Index to see if it is in the desirable or concerning range. Those taking Omega-3/fish oil supplements should take the test to see if they need to adjust their dosage. You want to target a range of 8%-12% for your Omega-3 Index score.  
  **Price: $74.25**

- **PERSONALIZED AMINO ACID HEALTH ASSESSMENT**  
  An in-depth analysis of amino acid metabolism provides insight into various health concerns, such as malabsorption, GI dysbiosis, neurological issues and more, with a personalized report of diet and supplementation suggestions. Provided as an at-home urine collection kit.  
  **Price: $224.25**

- **ENVIRONMENTAL POLLUTANTS PROFILE**  
  Toxic pollutants affect our bodies in several different ways. This test helps assess possible exposure to several common environmental pollutants by measuring their urinary metabolites.  
  **Price: $111.75**
**GUT MICROBIOME TESTING**

- **CPP STOOL ANALYSIS (CPP)*** (LC100093) $224.25
  - Good starting point for evaluating microbiome-related gastrointestinal concerns. Identifying presence of common pathogenic microorganisms associated with acute GI distress. Includes advanced bacteria/yeast culture, pathogen detection by PCR, and parasitology.

- **COMPREHENSIVE STOOL ANALYSIS (CSAP)*** (LC100083) $299.25
  - Better assessment of the gut microbiome and digestive health. Contains all the tests in the CPP Stool Analysis with additional markers of digestive function, inflammation & immune function (stool chemistry), important for ongoing chronic and acute GI concerns.

- **GI360™** **STOOL ANALYSIS (LC100088) $379.25
  - Best and most advanced assessment of microbiome dysbiosis, diversity and digestive health, the GI360 provides the most information about gut and microbiome health. Contains all the tests contained in the CPP and CSAP along with cutting-edge markers of microbiome diversity and dysbiosis.

**WHOLE-BODY HEALTH**

- **MALE ELITE PANEL* (LC100016) $431.25
  - CBC/Chemistry/Lipids Panel • Free and Total Testosterone • Estradiol • Total Estrogens • DHEA-S • Progesterone • Pregnenolone • TSH • DHT • FSH • LH • Free T3 • Free T4 • Reverse T3 • TGF-1 • SHBG • Free and Total PSA • Vitamin D 25-OH • hs-CRP • Ferritin • TIBC • Homocysteine • Insulin • Hemoglobin A1c • Cortisol • ApoB • Magnesium

- **MALE BASIC HORMONE PANEL (LC100012) $56.25
  - DHEA-S • Estradiol • Total and Free Testosterone • PSA

- **FEMALE ELITE PANEL* (LC100017) $431.25
  - CBC/Chemistry/Lipids Panel • Free and Total Testosterone • Estradiol • Total Lipids • Estrone • DHEA-S • Progesterone • Pregnenolone • DHT • FSH • LH • TSH • Free T3 • Free T4 • Reverse T3 • TGF-1 • SHBG • Vitamin D 25-OH • hs-CRP • Ferritin • TIBC • Homocysteine • Insulin • Hemoglobin A1c • Cortisol • ApoB • Magnesium

- **FEMALE BASIC HORMONE PANEL (LC100013) $56.25
  - DHEA-S • Estradiol • Total and Free Testosterone • Progesterone

- **WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028) $206.25
  - CBC/Chemistry/Lipids Panel • DHEA-S • Free and Total Testosterone • Estradiol • Total Lipids • Estrone • DHEA-S • Progesterone • Pregnenolone • TSH • DHT • FSH • LH • Free T3 • Free T4 • Reverse T3 • TGF-1 • SHBG • Vitamin D 25-Hydroxy • Ferritin • C-reactive protein (high sensitivity)

- **HEALTHY AGING PANEL-COMPREHENSIVE** (LC100026) $186.75
  - CBC/Chemistry/Lipids Panel • C-reactive protein (high sensitivity) • Vitamin B12 • Folate • Homocysteine • Vitamin D 25-Hydroxy • Hemoglobin A1c • TSH • Free T3 • Free T4 • Ferritin • Urinalysis • ApoB • Insulin

- **COMPLETE HORMONE & METABOLITES PROFILE (HUMAP)** (LC900001) $224.25
  - Comprehensive assessment of hormones and their metabolites. This urine test helps assess how your body metabolizes hormones, providing insight into endogenous hormone secretion, supplemental hormone utilization, enzyme activity, oxidative stress.

**NEW**

- **MALE BASIC NUTRITION PROFILE (LC100001) $123.75
  - New Male Basic Nutrition Profile
  - New Male Basic Nutrition Profile
  - New Male Basic Nutrition Profile
  - New Male Basic Nutrition Profile

**NEW**

- **FEMALE BASIC NUTRITION PROFILE (LC100002) $123.75
  - New Female Basic Nutrition Profile
  - New Female Basic Nutrition Profile
  - New Female Basic Nutrition Profile
  - New Female Basic Nutrition Profile

**NEW**

- **COMPREHENSIVE NUTRITION PANEL (LC100003) $123.75
  - New Comprehensive Nutrition Panel
  - New Comprehensive Nutrition Panel
  - New Comprehensive Nutrition Panel
  - New Comprehensive Nutrition Panel

**NEW**

- **PRO7 ADVANCED NUTRIGENOMIC PROFILE** (LC100097) $224.25
  - Analyzes genetics in 7 key areas of health (methylation, neurotransmitters, mitochondrial health, detoxification, inflammation, and more) and provides genetically targeted nutritional suggestions.

**NEW**

- **APOE GENETIC TEST FOR ALZHEIMER’S AND CARDIAC RISK** (LC100059) $111.75
  - This simple at-home cheek swab reveals your ApoE genotype and association with risk of Alzheimer’s and cardiovascular disease.

**NEW**

- **FOOD SENSITIVITY PANEL-ELITE*** (LC100096) $336.75
  - This in-depth food sensitivity assessment measures both IgG and IgA response to 240 foods.

**NEW**

- **GUT BARRIER PANEL** (LC900004) $123.75
  - Measure immune response (IgG/C3d & IgA) to three key GI markers associated with intestinal permeability and leaky gut: Candida, Zonulin, and Occludin.

**NEW**

- **WHOLE-BODY HEALTH**
  - **CBC/Chemistry/Lipids Panel**
  - **Complete Blood Count (CBC)**
  - **Chemical Panel (Chem)**
  - **Lipid Panel (Lipid)**
  - **HDL Ratio**
  - **Estimated CHD Risk**
  - **Glucose**
  - **AST (SGOT)**
  - **ALT (SGPT)**
  - **LDH**
  - **Total Bilirubin**
  - **Alkaline phosphatase**
  - **Calcium**
  - **Potassium**
  - **Sodium**
  - **Chloride**
  - **Iron**
  - **BUN**
  - **Creatinine**
  - **BUN/Creatinine Ratio**
  - **Uric Acid**
  - **MCV**
  - **MCH**
  - **MCHC**
  - **Neutrophils**
  - **Baso (Absolute)**
  - **RDW**
  - **Monocytes (Absolute)**
  - **Monocytes**
  - **Red Blood Cell Count**
  - **White Blood Cell Count**
  - **Eosinophils**
  - **Baso (Absolute)**
  - **RDW**
  - **Monocytes (Absolute)**
  - **Monocytes**
  - **Lymphocytes**
  - **Platelet Count**
  - **Hemoglobin**
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  - **Albumin**
  - **Globulin**
  - **Albumin/Globulin Ratio**
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  - **Calcium**
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  - **Sodium**
  - **Chloride**
  - **Iron**

**NEW**

- **WEIGHT LOSS PANEL-COMPREHENSIVE (LC100028) $206.25
  - CBC/Chemistry/Lipids Panel • DHEA-S • Free and Total Testosterone • Estradiol • Total Lipids • Estrone • DHEA-S • Progesterone • Pregnenolone • TSH • DHT • FSH • LH • Free T3 • Free T4 • Reverse T3 • TGF-1 • SHBG • Vitamin D 25-Hydroxy • Ferritin • C-reactive protein (high sensitivity)

**NEW**

- **COMPLETE HORMONE & METABOLITES PROFILE (HUMAP)** (LC900001) $224.25
  - Comprehensive assessment of hormones and their metabolites. This urine test helps assess how your body metabolizes hormones, providing insight into endogenous hormone secretion, supplemental hormone utilization, enzyme activity, oxidative stress.

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**NEW**

- **GUT BARRIER PANEL** (LC900004) $123.75
  - Measure immune response (IgG/C3d & IgA) to three key GI markers associated with intestinal permeability and leaky gut: Candida, Zonulin, and Occludin.
If you want to feel great after you eat, you need to keep your already-healthy glucose levels in check. Glycemic Guard™ helps the body maintain already-healthy blood sugar levels—especially post-meal, when glucose spikes can occur.

Item #02122 • 30 vegetarian capsules

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Suggested dose is one capsule a day or as recommended by a healthcare practitioner.

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

“This product has been useful along with diet in keeping better blood sugar control.”

Myra

VERIFIED CUSTOMER REVIEW

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These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Glucosamine Associated with Reduced Risk of Cancer Mortality

Men and women who took glucosamine supplements had a lower risk of dying from cancer than those who did not, an article published in Frontiers in Nutrition reported.*

The study included 453,645 participants in the UK Biobank, which enrolled men and women aged 38–73 years from 2006–2010. These participants were followed until March 2021. None of the individuals in the current study had cancer at enrollment. Glucosamine supplements were used by 88,224 of the participants.

During a median follow-up of 12.1 years, glucosamine users had a 5% lower overall risk of cancer mortality, a 32% lower risk of kidney cancer mortality, a 16% lower risk of lung cancer mortality and a 24% lower risk of dying from cancer of the rectum, compared with those who did not use glucosamine. Among men who did not have diabetes or high cholesterol, glucosamine was protective against prostate cancer mortality.

Editor’s Note: Research findings indicate that glucosamine’s antitumor effects are achieved by inhibiting cancer cell proliferation, inducing programmed cell death, reversing tumor drug resistance, helping to prevent the formation of new blood vessels by tumors and other factors.

* Front Nutr. 2022 Nov 2;9:947818.
Whey Protein Improves Blood Glucose in Type II Diabetics

Consuming a large dose of whey protein before meals improves glucose control among type II diabetics, according to a study published in BMJ Open Diabetes Research & Care.*

The crossover study included 18 type II, insulin naïve, diabetic participants who received either a drink containing 15 grams of whey protein or a nutrient-depleted placebo, 10 minutes before breakfast, lunch, and dinner for seven days. This was followed by a two-week period with no intervention. Next, for an additional seven days, participants who had previously received whey protein were given a placebo and those who had received the placebo were given whey protein.

Continuous glucose monitoring showed improved daily blood glucose levels in association with whey intake. Participants experienced an increase of two hours per day of normal glucose levels during the week in which whey was consumed, in comparison with the week in which the placebo was administered.

Editor's Note: “Nutrition plays an integral role in the management of type II diabetes and represents an opportunity to optimize glycemic control in a cost-effective manner,” the authors stated.

Varying Responses to Vitamin D Supplementation Explained

New research published in *JAMA Network Open* continues to show an association between higher body mass index and diminished response to supplementation with vitamin D.1

Researchers evaluated data from a subset of VITAL (a trial of vitamin D3 2000 IU/d and omega-3 fatty acids 1 g/d for primary prevention of cancer and cardiovascular disease).

For this study, 16,515 men and women were eligible for the analysis—those who contributed to baseline blood samples and repeated samples at the two-year follow-up in the VITAL trial. Treatment outcomes of vitamin D supplementation vs. placebo associated with vitamin D-related biomarkers were analyzed according to body mass index.

In the group that received vitamin D, the vitamin’s biomarkers increased compared with the placebo group. But the increases were less in participants with a higher BMI.

In a separate study, researchers found, due to volumetric dilution in obese patients, higher doses of vitamin D are needed to achieve the same serum concentration of vitamin D as compared to lean subjects.2

**Editor’s Note:** “Findings suggest that BMI may be associated with modified response to vitamin D supplementation and may in part explain the observed diminished outcomes of supplementation for various health outcomes among individuals with higher BMI,” the authors concluded.

Omega-3 Fatty Acid Levels Linked with Lower Risk of Kidney Disease

A study published in the *BMJ* found that having *higher* levels of the omega-3 fatty acids EPA, DHA and DPA, which are derived from seafood, is associated with a lower risk of developing chronic kidney disease.*

Data on 25,570 men and women from 19 studies were analyzed. Omega-3 fatty acids ALA, EPA, DHA and DPA were measured.

Participants were followed for a median of 11.3 years, during which 4,944 cases of chronic kidney disease occurred.

Researchers found that higher levels of seafood omega-3 fatty acid biomarkers were associated with an 8% lower risk of developing chronic kidney disease. Slower decline in renal function was also observed.

*Editor’s Note:* The authors noted that, “Patients with chronic kidney disease are at higher risk of cardiovascular disease and death because the condition could eventually progress to kidney failure that severely impacts health and quality of life.”

* BMJ 2023;380:e072909
The best way to keep YOU in the picture.

Ultra Prostate Formula was created to help maintain prostate health. It contains a dozen ingredients to:

- Support healthy urination
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- Support healthy prostate cell division

Ultra Prostate Formula is the most comprehensive standardized-ingredient prostate-health supplement.

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CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

For full product description and to order Vitamin D3, call 1-800-544-4440 or visit www.LifeExtension.com

Item #01713
125 mcg (5000 IU) • 60 softgels
1 bottle $7.50 • 4 bottles $6.50 each

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An Easy Way to Increase FIBER INTAKE
About 90% - 97% of American adults do not ingest the recommended amount of dietary fiber.\(^1\)

That’s a serious health concern.\(^2\)\(^-\)\(^5\)

Dietary fiber helps control blood sugar,\(^6\)\(^-\)\(^8\) cholesterol,\(^7\)\(^,\)\(^9\)\(^,\)\(^10\) blood pressure,\(^7\)\(^,\)\(^9\)\(^,\)\(^11\)\(^,\)\(^12\) and body weight,\(^6\)\(^,\)\(^7\)\(^,\)\(^9\)\(^,\)\(^13\) while promoting healthy gut bacteria.\(^14\)\(^,\)\(^15\)

Fiber can improve cardiovascular,\(^10\) gastrointestinal,\(^3\) and metabolic health.\(^16\)

Increased fiber consumption is associated with a decreased risk of dying from any cause.\(^17\)\(^,\)\(^18\)

Researchers have developed an easy way to boost fiber intake that was approved in 2020 by the FDA.

This fiber is made from the root of the konjac plant. It has been shown to be as effective as other fibers, at a lower dose that reduces GI discomforts.\(^19\)
An Alternative Fiber

For adults over 50, the Recommended Daily Allowance (RDA) for fiber is **30 grams** for men and **21 grams** for women. The average American consumes only **10-12 grams** daily.\(^{25}\)

That means most Americans are missing out on fiber’s ability to promote heart health,\(^{10}\) reduce blood sugar\(^{8}\) and body weight,\(^{12}\) and support healthy gut bacteria.\(^3\)

Fiber intake has also been linked to **lower all-cause mortality risk.**\(^{17,18}\)

Most fiber products contain psyllium husk, which requires **high doses** to deliver benefits. Many people find them unpleasantly filling.

Researchers investigating alternatives identified konjac root as a **soluble fiber** that provides the same health benefits as psyllium at significantly **smaller doses.**

Clinical Data

Clinical studies show that **konjac fiber:**

- Improves regularity and the balance of the gut microbiome,\(^{20,21}\)
- Supports weight loss,\(^{22}\)
- Reduces post-meal glucose and insulin levels,\(^{6,23}\) and
- **Lowers LDL** (“bad”) cholesterol by **10%.”**\(^{24}\)

Lower dose efficacy of **konjac fiber** is important. That’s because many people experience GI discomfort with traditional fiber and miss out on its lifesaving benefits.

Approved as Dietary Fiber

The **konjac plant** grows in Southeast Asia and Africa.\(^{26}\) It has been safely used to treat a wide range of ailments in China and Japan for centuries.\(^9,27\)

Consumed orally, konjac fiber passes relatively unchanged into the colon, where it acts as a **prebiotic,** a nutrient source for healthy bacteria.\(^{28,29}\)

Many studies have documented the benefits of konjac, and in 2020, the **FDA** approved konjac glucomannan, fiber derived from konjac root, as a dietary fiber.\(^{19}\)

Regularity and Microbiome Balance

Clinical trials show that konjac fiber benefits bowel movements and the **microbiome.**

One study of healthy adults measured the effect of taking **4.5 grams** of **konjac fiber** daily (compared to a placebo period) for three weeks. The results during the **konjac fiber** period were:\(^{20}\)

- **Significantly improved ease** of bowel movements,
- A **27%** increase in **number** of bowel movements,
- Improved markers of colonic bacteria **fermentation** (breakdown of carbohydrates into beneficial compounds), and
- Higher **concentrations** of beneficial fecal bacteria, including lactobacilli.

A similar study focused on adults suffering from **constipation.**\(^{21}\)

After taking **4.5 grams** of konjac fiber daily for three weeks, subjects had, compared to a placebo phase:\(^{21}\)

- A **29%** increase in **number** of bowel movements,
- Significantly improved ease of bowel movements,
- Greater feeling of complete **relief,**
- Increased production of **short-chain fatty acids,** which are critical to gastrointestinal health,
- Higher fecal concentration of beneficial **bifidobacterial** and lactobacilli bacteria, and
- **Decreased** proportion of clostridia, potentially harmful bacteria.
Weight Loss

Konjac fiber also helps with excess body weight. In a trial, overweight adults were put on a low-calorie diet and randomly assigned to take, in divided doses, either a placebo or one of three fiber combinations providing a daily total of:22

- 1,240 mg of glucomannan derived from konjac root, or
- 420 mg of glucomannan plus 420 mg of guar gum, or
- 4,320 mg of glucomannan plus 900 mg of guar gum and 900 mg of alginate.

After five weeks, compared to placebo, 1.76 lbs. per week weight loss was observed among all fiber groups. However, adding the fibers guar gum and alginate did not cause additional weight loss beyond the amount achieved by konjac glucomannan alone.22

Blood Sugar and Insulin

The effects of konjac on blood sugar and insulin were investigated in adults whose glucose tolerance ranged from normal to borderline. Over the course of a study, all volunteers received:23

- Rice porridge alone,
- Rice porridge with 1 gram of konjac glucomannan added, and
- Rice porridge with 2 grams of konjac glucomannan added.

Adding konjac fiber to the porridge significantly reduced levels of post-meal blood sugar after 30 minutes. Groups that received konjac had up to 14.4 mg/dL lower blood sugar as compared to the group that received rice porridge alone. Similar results were observed with insulin. Higher doses resulted in greater reductions.23

Reductions in blood sugar and insulin were greater in subjects with borderline glucose tolerance than in those with normal glucose tolerance.

Improved Blood Lipids

A meta-analysis of clinical trials on patients with high cholesterol showed that taking 3 grams daily of konjac glucomannan over a median period of four weeks reduced LDL (“bad”) cholesterol levels by 10%.24

Other types of soluble fiber may lower LDL cholesterol by 5% at doses of 5-10 grams. Just 3 grams of konjac may reduce LDL by twice as much.

Data also showed that a median daily dose of 3.3 grams of konjac fiber for a median of four weeks reduced overall cholesterol (excluding protective HDL) by 7%.24

Along with its other benefits, these results suggest that konjac fiber can significantly improve overall health.

The Benefits of Konjac Fiber

- Getting too little fiber can cause health problems. Many people find the psyllium fiber in most products to be too bulking.
- A fiber derived from the root of the konjac plant provides the same benefits at a lower and less filling dose than psyllium.
- Clinical studies show that konjac fiber promotes bowel regularity, has prebiotic effects, lowers body weight, reduces blood sugar and insulin levels, and lowers cholesterol.
AN EASY WAY TO INCREASE FIBER INTAKE

Summary

Insufficient fiber intake increases the risk for serious disorders and early death.

Trials have shown that konjac fiber improves bowel regularity, body weight, blood sugar, cholesterol, and microbiome makeup.

Konjac protects as well as psyllium but at a lower dose, making it easier to take.

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

Healthy skin. Comfortable joints. Both rely on collagen. Our **Collagen Peptides for Skin & Joints** formula:

- Stimulates increased production of collagen in the body
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- Protects joint cartilage

For full product description or to order **Collagen Peptides for Skin & Joints**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

Item #02408
343 grams of powder (0.75 lb or 12 oz)
1 jar $27
4 jars $24 each

MIX ONE SCOOP WITH WATER OR BEVERAGE OF CHOICE

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‘Not only do I see skin improvements, my joint stiffness has decreased.’

**Lucinda**

VERIFIED CUSTOMER REVIEW

Baby your Skin
Whole-Body Support

Everything good takes time.

Magnesium is essential for a healthy heart and sturdy bones; it’s even great for your mood. But, most of us don’t get enough from our diets.

Our innovative formula delivers both immediate and extended-release magnesium, so you get the maximum benefits—for the long haul.

“For overall health for bones. Great product.”

Roniele
VERIFIED CUSTOMER REVIEW

It’s time for magnesium.

Magnesium is essential for a healthy heart and sturdy bones; it’s even great for your mood. But, most of us don’t get enough from our diets.

Our innovative formula delivers both immediate and extended-release magnesium, so you get the maximum benefits—for the long haul.

“For overall health for bones. Great product.”

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

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

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Get More FIBER the Easy Way

ENJOY FIBER BENEFITS without THE BLOATING

Most soluble fiber products contain psyllium husk that requires higher doses to deliver benefits. The side effect is often unpleasant bloating.

Konjac root contains a soluble fiber that provides benefits at smaller doses than psyllium, so it’s much less filling.

New Easy Fiber provides 1,000 mg of glucomannan from konjac root in each dose to support:1-5

- Satiety and weight management†
- Regularity
- Digestion
- Heart health and already healthy cholesterol levels
- Gut microbiome; contains prebiotic fiber
- Already healthy blood sugar and insulin levels

Natural orange flavor with other natural flavors and sugar free!

Item #02514
167 G (0.368 lb. or 5.9 oz.)
1 jar $22.50  4 jars $20 each

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

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References:

† This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary.
Activate Your
**FAT-BURNING**
Enzyme
*Turn on more AMPK!*
AMPK is a cell enzyme that turns on fat-burning\(^1\) and other beneficial cellular processes.\(^2,3\)

With age, AMPK activity tends to decrease.\(^4\)

Two plant compounds have been shown to promote youthful AMPK activity:\(^5,6\)

- *Gynostemma pentaphyllum*\(^5,7\) and
- *Hesperidin*.\(^8\)

Together, these compounds may help slash unwanted belly fat.
ACTIVATE YOUR FAT-BURNING ENZYME

What is AMPK?

Excess abdominal fat is a major health problem. It churns out a steady stream of pro-inflammatory compounds that damage blood vessels, heart muscle, brain cells, and other tissues.9,10

Belly fat is strongly linked to heart disease,10,11 type II diabetes,12 and other health issues.13,14

AMPK is an enzyme inside cells that helps regulate glucose and fat metabolism.15-17

When activated, AMPK enhances energy metabolism,2,18 which helps reduce abdominal fat5 and the inflammation18 it produces.

AMPK signaling may decline with age. This results in impaired metabolic function, increased inflammation, and reduced cellular housekeeping functions—all of which accelerate aging.2,18,19

A decrease in AMPK activity also leads to weight gain because the body is more likely to store fat rather than burn it for energy.20

The plant compounds G. pentaphyllum and hesperidin have been shown to promote AMPK activity, mitigating abdominal obesity and the damaging inflammation it generates.

Enhanced Gynostemma

Gynostemma pentaphyllum is an herb that has been shown in clinical and preclinical studies to help prevent metabolic disorders like obesity,21 glucose metabolism,7 elevated lipid levels,7,22 and fatty liver.21-24

Lab and animal studies also demonstrate that G. pentaphyllum is an AMPK activator7,23 that stimulates fat burning and cellular uptake of glucose in muscle cells. It has been shown to decrease weight gain and cholesterol levels.22,23

In a 2022 mouse study, researchers found that Gynostemma extract inhibited weight gain.25

In another study, G. pentaphyllum extract reduced fat mass, enhanced exercise endurance, and increased performance in treadmill-trained mice.26

To fully combat the age-related drop-off in AMPK activity in humans and the resultant belly fat accumulation, researchers in South Korea developed a much stronger form of this extract than was initially available at the time.

They used heat and pressure treatments combined with a steam sterilization technique called autoclaving to produce a G. pentaphyllum extract that contains 10 times the quantity of two of its key AMPK-boosting compounds, damulin A and damulin B.27 This specially processed G. pentaphyllum has been the gold standard for several years.

In a 12-week human trial, this extract triggered a remarkable 11% decrease in abdominal fat.5

This potent G. pentaphyllum extract is so novel, it was granted a patent by the U.S. government.27

Losing Belly and Body Fat

To validate this extract’s ability to reduce abdominal obesity, scientists enlisted 80 overweight people with a body mass index (BMI) between 25 and 30 kg/m2. Volunteers were randomly assigned to receive 450 mg a day of the patented G. pentaphyllum extract or a placebo. Both groups continued their usual diets.

During the 12-week study, total abdominal fat area, body weight, body fat mass, percent body fat, and body mass index all decreased in those taking G. pentaphyllum compared to placebo recipients.5
The results showed that:\(^5\)

- **Total fat** area fell *6.3%* in people receiving extracts, but less than *1%* in the placebo group,

- **Abdominal fat** deposits fell *11%* in the extract group, but only *3%* in the placebo group, and

- **Subcutaneous fat** (found just under the skin) decreased nearly *4%* in treated subjects, but *increased* slightly in placebo recipients.

Additionally, those receiving *G. pentaphyllum* lost an average of one inch off their waistline, equal to about one belt notch.

**Fat-Fighting Hesperidin**

*Hesperidin* is a flavonoid found in citrus fruits. Preclinical studies have demonstrated that it activates **AMPK**.\(^6,8,28,29\)

It may help fight fat accumulation in other ways as well, including by:

- Inhibiting **absorption** of dietary fat from the gut,\(^30,31\)

- Inhibiting genes involved in all phases of **fat cell** development,\(^32\)

- Promoting the production of **enzymes** that break down body fat,\(^32,33\)

- Reducing body fat **accumulation** and storage,\(^32\) and

- Increasing secretion of **adiponectin**, a hormone that decreases appetite and inflammation.\(^8\)

In a human study, 40 healthy amateur athletes were given *500 mg* of hesperidin or a placebo daily for eight weeks. They maintained their usual diet and lifestyle.\(^34\)

In the hesperidin group, average percent **body fat** decreased by *3.7%*.\(^34\)

In a clinical trial of 24 individuals with metabolic syndrome, participants were given *500 mg* per day of *hesperidin* or placebo for three weeks. After three weeks significant improvements in biomarkers of inflammation, vascular function and metabolic parameters were seen in the treatment group compared to placebo.\(^6\)
Together, **hesperidin** and **Gynostemma extract** may complement each other and maximize the effect of targeting abdominal fat.

**Summary**

The decline in **AMPK** activity that occurs with aging leads to increased **abdominal fat** and harmful inflammation.

**Gynostemma pentaphyllum** extract increases AMPK activity and reduces **belly fat**.

Preclinical evidence has revealed that the citrus compound **hesperidin** also stimulates AMPK activity and could work in other ways to further reduce belly and overall body fat.

These compounds provide a dual-action approach to reducing **abdominal fat**.

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**

Super Omega-3 provides components found in Mediterranean diets, including sesame lignans to enhance the health benefits of fish oil.

SUPER OMEGA-3 PLUS
EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
(2,520 mg of EPA + DHA in four softgels)

Item #01988 • 120 softgels
1 bottle $36.75
4 bottles $34 each

SUPER OMEGA-3
EPA/DHA Fish Oil, Sesame Lignans & Olive Extract
(2,400 mg of EPA + DHA in four softgels)

Item #01982 • 120 softgels
1 bottle $27
4 bottles $25 each

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

For full product description and to order Super Omega-3, or Super Omega-3 Plus, call 1-800-544-4440 or visit www.LifeExtension.com

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

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Many women need a little help when it comes to bladder and urinary health.¹

**Women’s Bladder Support** contains three herbal extracts shown to support women’s bladder and urinary functions:

- **Horsetail**
- **Lindera**
- **Three-leaf caper**

This three-herb blend can help maintain bladder comfort and normal urinary frequency—with women reporting positive results in a clinical study.²

For full product description and to order **Women’s Bladder Support**, call 1-800-544-4440 or visit www.LifeExtension.com

References

**Item #02513**
- 60 vegetarian capsules
- 1 bottle $30
- 4 bottles $27.50 each

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CONQUER BELLY FAT WITH AMPK

Studies show that increasing AMPK activity encourages cells to stop storing fat and start burning it for energy. So we’ve created AMPK Metabolic Activator to help trigger AMPK, causing your body to burn unwanted fat—particularly around your abdomen.

Item #02207 • 30 vegetarian tablets
1 bottle $28.50 • 4 bottles $24 each

This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary. Actiponin® is a trademark of TG Biotech Co., Ltd.

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In recent years, scientists have established that the accumulation of dysfunctional senescent cells is a factor in the development of degenerative illnesses.\textsuperscript{1,2}

It was not always clear, however, what impact cellular senescence had on brain function. Published research now indicates that senescent cells play a role in cognitive impairment and disorders such as Alzheimer’s\textsuperscript{3-5} and Parkinson’s.\textsuperscript{4,6}

Studies in animal models suggest that using compounds called senolytics to eradicate senescent cells from the brain can lead to improvements in brain function and even reverse cognitive deficits.\textsuperscript{7,9}

Several plant-based compounds have been identified that help remove senescent cells from the body.
How Senescent Cells Cause Disease

As cells age and degrade, they’re supposed to die off to make room for new cells. But some don’t, instead becoming dysfunctional and steadily causing damage.

These senescent cells release toxic compounds that damage nearby cells and tissues and incite damaging inflammation.

**Cellular senescence** is a driver of aging and risk for many age-related chronic diseases.1,2

Studies have examined the kidneys, blood vessels, lungs, bones, and other tissues. In *every one of them*, cellular senescence has been found to be deleterious.

Scientists now know that the brain is no different.

It has long been accepted that oxidative stress, inflammation, and abnormal protein deposits all contribute to brain aging and neurodegenerative diseases like Alzheimer’s and Parkinson’s diseases.

Now, scientists have added cellular senescence to the list of neurodegenerative contributors.3-6,10

**Cellular Senescence and the Brain**

The brain is home to several different cell types that work together.

**Neurons** are the primary nerve cells of the brain that are wired together into synaptic circuits.

Other cells, including astrocytes, microglia, and oligodendrocytes, have important roles such as maintaining the synaptic environment (astrocytes), functioning as the brain’s immune system (microglia), and generating the insulating myelin sheath (oligodendrocytes).

These cells work closely with neurons and are required for normal neurotransmission and synaptic plasticity (the brain’s ability to adapt to new information).11-13

Recent studies suggest that cellular senescence is a culprit in brain aging,3-6 affecting neurons and support cells that make up about 50% of the brain.10

With age, the function of all these brain cells is diminished, leading to lower levels of some neurotransmitters, impaired synaptic signaling, and more. The result is deteriorating brain function and risk for dementias.3-5

For example, preclinical and clinical studies show that abnormal deposits of beta-amyloid plaques associated with Alzheimer’s disease can cause normal brain cells to shift into senescence.14,15 This has been seen in astrocytes, microglia, and oligodendrocytes, which are all critical to neuronal health.16

**Senolytic Approaches**

**Senolytic** compounds are used to help remove senescent cells, slow certain aging processes, and rejuvenate tissues.

The objective is to selectively eliminate senescent cells while not affecting normal, healthy cells. A number of senolytics have shown promise in animal models and a clinical trial. More human trials are underway for a wide range of diseases.1,17

The investigation of senolytics for the management of age-related brain disorders has only recently begun, but has already shown promise.
Multiple preclinical studies have shown that senolytics can effectively remove senescent cells from the brain and that this may lead to improvements in cognitive function.

One study done by the National Institute on Aging and the Johns Hopkins University School of Medicine explored a mouse model of Alzheimer’s disease. In these animals, cells in the vicinity of amyloid plaques show signs of cellular senescence.

Treating these animals with two senolytics, the cancer drug dasatinib and the plant compound quercetin, eliminated senescent cells, reduced brain inflammation, and lessened the load of amyloid deposits.

Most remarkably, this treatment led to a reversal of cognitive deficits.

Human trials of senolytics in adults with mild cognitive impairment or Alzheimer’s disease are currently underway. They are also using a dasatinib-quercetin combination, but plant-based senolytics may also prove to have brain-aging fighting benefits.

**Summary**

Research indicates that senescent cells play a role in brain aging and common brain disorders such as Alzheimer’s.

Senolytic compounds eliminate senescent cells from tissues to slow certain aging processes and reduce degenerative disease risks.

Studies in animal models reveal that senolytics can effectively remove senescent cells from the brain, reversing cognitive deficits.

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**How Senolytics Protect the Brain**

- As cells age and accumulate damage, they can enter a state known as cellular senescence. Senescent cells can cause dysfunction and damage throughout the body.

- Senescent cells are a major driver of aging and the development of many age-related chronic diseases.

- Recent research has confirmed that cellular senescence also affects the cells of the brain, including neurons.

- Studies have shown that senescent cells contribute to brain aging and the progression of neurodegenerative disorders like Alzheimer’s disease.

- Senolytics are compounds that are capable of eliminating senescent cells, rejuvenating tissues and improving their function.

- In animal models, senolytic therapy reverses the pathology associated with neurodegenerative disease and improves cognitive function.
References


Plant-Derived Senolytics

Certain plant-derived nutrients have been shown to remove senescent cells from the body.20 They work in different ways and appear to be more powerful together than they are alone.

- **Quercetin** is a flavonoid found in many plants. It displays remarkable senolytic activity alone but has traditionally been used alongside the cancer drug dasatinib.20,21

- Another plant flavonoid, **fisetin**, is the most potent plant-derived senolytic discovered to date.24,25 It has been shown to be neuroprotective in animal models of Alzheimer’s disease, Parkinson’s disease, and more.

- **Apigenin**—found in chamomile flowers and other plants—reduces the pro-inflammatory compounds emitted by senescent cells, quenching the fire of chronic inflammation.26,27

A combination of these **four** nutrients attacks senescent cells from multiple angles.

If you have any questions on the scientific content of this article, please call a Life Extension Wellness Specialist at 1-866-864-3027.
Thermo Weight Control contains a patented red-chili extract that increases burning of calories.†

Clinical results demonstrate reduced body mass including a decreased waist-to-hip ratio of 4%† after only 28 days.

Thermo Weight Control targets calories with capsaicin embedded in a plant fiber for optimal systemic benefits.

Specially formulated to be gentle on the stomach, these low-cost red-chili extract capsules can help maximize your weight management program.

Item #02511 • 60 vegetarian capsules
1 bottle $15 • 4 bottles $13.50 each

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

† This supplement should be taken in conjunction with a healthy diet and regular exercise program. Individual results are not guaranteed, and results may vary.

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L-ergothioneine is an amino acid found in mushrooms. Cell-based studies suggest that L-ergothioneine may support healthy longevity by:

- Protecting mitochondrial DNA function
- Delaying telomere shortening
- Supporting DNA function in cells subjected to UV exposure

One daily capsule of Essential Youth provides 5 mg of L-ergothioneine.

One daily capsule provides as much L-ergothioneine as 2 to 5 cups of white button mushrooms.

References
With age, our body accumulates senescent cells that affect the day-to-day function of the healthy cells around them.

Senolytics are compounds that selectively remove senescent cells. Senolytic Activator® contains nutrients designed to target senescent cells for normal elimination.

This formula contains a patented fisetin that is more bioavailable than regular fisetin.

The fisetin dose in Senolytic Activator® provides the potency of 7 capsules of Bio-Fisetin. (Some people take Bio-Fisetin daily for its other health benefits.)

COMPREHENSIVE SENOLYTIC SUPPORT

The Senolytic Activator® formula provides the following nutrients:

- THEAFLAVINS (polyphenols from black tea)
- BIO-QUERCETIN (ultra-absorbable form)
- APIGENIN (a natural flavonoid)
- BIO-FISETIN (up to 25 times greater bioavailability)

The suggested dose of the Senolytic Activator® is 3 capsules once a week. Each bottle lasts 3 months and costs very little.
Relief of Menopause Symptoms

**Menopausal** symptoms make women miserable.

For those who prefer to avoid hormones, there’s a practical alternative.

Used widely in **Germany** for decades, a **Siberian rhubarb** root extract has been shown to significantly reduce **all** common menopausal symptoms—**without** side effects.

In one study, it led to an **83% reduction** in the severity of **menopause** symptoms.
**Common Menopause Symptoms**

**Menopause** officially begins when a woman has gone 12 months without menstruating. Symptoms generally start when a woman is in her 40s in response to reduced production of estrogen and progesterone.²

The 11 commonly recognized symptoms of menopause include:³

- Hot flashes and excessive sweating,
- Sleep problems,
- Physical and mental exhaustion,
- Depressive mood,
- Heart discomfort,
- Irritability,
- Anxiety,
- Joint and muscular discomfort,
- Sexual problems,
- Bladder problems, and
- Vaginal dryness.

A plant extract has been shown to alleviate all these symptoms...without hormones.

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**The Rhubarb Remedy**

For decades, Germans have used an extract from the root of the Siberian rhubarb plant to treat menopausal symptoms.⁴,⁵

Most of these symptoms are caused by decreased estrogen production. Estrogen binds to receptor sites on cell membranes to activate cellular processes.

In preclinical studies, the extract from the roots of Siberian rhubarb has shown greater affinity for the beneficial estrogen receptor-beta (ER-beta) than for potentially detrimental estrogen receptor-alpha (ER-alpha).⁶,⁷

The ability of Siberian rhubarb extract to selectively activate ER-beta but not ER-alpha is a key reason for its safety.⁸

In multiple studies, this extract has significantly improved all 11 symptoms.

In one study, 109 perimenopausal women received 4 mg of Siberian rhubarb extract or a placebo daily for three months. Within one month, those receiving Siberian rhubarb reported significant reductions in the number and severity of hot flashes. After three months, women taking the extract had a 54% reduction in the severity of menopause symptoms.⁹
Other studies have reported even more robust benefits.

A trial of 112 menopausal women\textsuperscript{10} found that taking 4 mg of Siberian rhubarb for three months decreased the median number of hot flashes from 12 episodes to 2 episodes per day. That’s a six-fold reduction! Women in the placebo group had a median 8\% increase in the number of daily hot flashes.

In a year-long trial of perimenopausal women, those taking Siberian rhubarb extract daily had a remarkable 83\% reduction in the overall severity of symptoms.\textsuperscript{1}

\begin{itemize}
  \item Menopause is accompanied by 11 common symptoms, including hot flashes, sleep problems, mood swings, bladder, and sexual problems, and more.
  \item Siberian rhubarb extract has been widely used in Germany for decades to manage menopause symptoms safely and effectively.
  \item Multiple human studies show that Siberian rhubarb extract significantly relieves all 11 symptoms and reduces overall symptom severity by up to 83\%.
\end{itemize}

The benefits of Siberian rhubarb extend to all common symptoms.

Sleep difficulties affect most menopausal women, particularly during perimenopause.\textsuperscript{11,12} Perimenopausal women taking a daily dose of Siberian rhubarb extract reduced the severity of sleep problems by up to 60\%.\textsuperscript{10}

Mood changes, irritability, depression, and anxiety are also common during perimenopause.\textsuperscript{13,14} One study recruited perimenopausal women who reported feelings of anxiety, including being “in low spirits” most of the time. After taking Siberian rhubarb for three months, 59\% of the women reported being “in good spirits mostly,” and 9\% reported being “in very good spirits mostly.” Those taking Siberian rhubarb had an over 60\% decline in anxiety scores.\textsuperscript{5}

Research also shows that physical and mental exhaustion—two of the most common menopausal symptoms\textsuperscript{15}—were improved with the extract, in one 48-week observational study, by up to 57\%.\textsuperscript{1}

Menopause is also associated with urogenital symptoms, including painful intercourse, vaginal dryness, and urinary incontinence.\textsuperscript{16}
Women who took Siberian rhubarb daily for three months had about 45%-59% reduction in severity of urogenital, sexual, and vaginal dryness symptoms, compared to baseline levels.1

In a study of self-reported “heart symptoms,” menopausal women taking Siberian rhubarb extract reported about 60% fewer heart concerns, including fewer heart palpitations and less discomfort, within about three months.1

Strong Safety Record

In Germany, millions of menopausal women use Siberian rhubarb extract to support vasomotor symptoms, with over two decades of data showing that it is safe.4,6,17

A study of perimenopausal women in India17 published in 2021 found that taking 4 mg of Siberian rhubarb extract daily for three months reduced all 11 menopausal symptoms, and caused no side effects or significant changes in blood pressure, lipid profile, or C-reactive protein (a marker of inflammation).

These and other studies tracking the health of women who took Siberian rhubarb daily found this was safe, with no significant health concerns, such as changes in breast or endometrial tissues, resulting from use.9,10 Women were followed for up to two years in one of these studies.9

These and other findings support the use of Siberian rhubarb extract as an effective way to manage menopausal symptoms.

Summary

The onset of menopause is accompanied by uncomfortable symptoms that can last for years. Siberian rhubarb root extract has been safely used for decades by millions of women in Europe.

Multiple studies affirm its effectiveness in reducing the frequency and severity of hot flashes, sleep problems, mood changes, and all other common menopause symptoms.

References


If you have any questions on the scientific content of this article, please call a Life Extension Wellness Specialist at 1-866-864-3027.
Fisetin, a flavonoid found in strawberries and apples, is currently being studied for its effectiveness as a senolytic in humans.\(^1\)

In preclinical studies, fisetin:
- Mimics effects of calorie reduction\(^2\)
- Targets longevity pathways\(^2-6\)
- Extends lifespan of mice by about 10%\(^7\)
- Removes senescent cells through senolytic action\(^7\)
- Suppresses excess mTOR activation\(^8\)

Fisetin is poorly absorbed due to its breakdown in the small intestines.

Bio-Fisetin solves this problem by enclosing fisetin with a compound from the fenugreek herb.

A human trial showed bioavailability of this fisetin compound increased up to 25 times compared to fisetin by itself.\(^9\)

Just one capsule daily of Bio-Fisetin helps manage senescent cells and may support overall longevity.

Item #02414
30 vegetarian capsules
1 bottle $11.25
4 bottles $10 each

References

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
FLORASSIST® Oral Hygiene provides the S. salivarius BLIS M18™ oral probiotic that colonizes the mouth and inhibits the growth of unwanted bacteria.¹⁻²

This product also contains beneficial Immuno-LP20®.

Just one mint cherry lozenge of FLORASSIST® Oral Hygiene a day maximizes oral hygiene by supporting healthy bacterial colonization throughout the mouth.³⁻⁴

References

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

BLIS™ and BLIS M18™ are trademarks of Blis Technologies Limited and the subject of USA patent no. 7226590. Immuno-LP20® is a registered trademark of House Foods Group Inc.
Menopause 731™ contains ERr 731®, a proprietary extract of Siberian rhubarb.

In clinical studies ERr 731® provides hormone-free relief for all 11 menopause discomforts on the Menopause Rating Scale, including:

- Hot flashes
- Night sweats
- Irritability
- Sleep disturbances
- Exhaustion
- Sexual function
- Joint discomfort
- Bladder problems
- Vaginal dryness

Item #02204

30 enteric-coated vegetarian tablets
1 bottle $18 • 4 bottles $16 each

Caution: Do not take if you have, or have a history of, estrogen-dependent tumors.

For full product description and to order Menopause 731™, call 1-800-544-4440 or visit www.LifeExtension.com

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Theanine
A Sustained Sense of Calm

Theanine XR™ Stress Relief promotes alert relaxation and a feeling of well-being throughout the day.*

Just one sustained-release tablet enables a continuous flow of L-theanine to the brain for sustained tranquility.


Item #02429 • 30 vegetarian tablets
1 bottle $21 • 4 bottles $18.50 each

One tablet per day dosing.

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Lab tests provide invaluable information to improve your health and to share with your doctor.

Life Extension® has identified new tests ranging from biological age, hormones, amino acid and allergies, to toxic metals.

Most physicians do not offer these unique tests. Life Extension’s goal is to provide the most advanced testing possibilities so you can make informed decisions about your health based on the latest and most accurate data.

In this article, Dr. Scott Fogle, ND, discusses some of the latest lab tests that are currently available.

LE: Many people worry about exposure to pollutants. Is there testing for heavy metals or other toxins?

Dr. Fogle: The Blood Metals Panel is a blood-spot finger-prick test done at home. It covers the five most problematic metals: lead, mercury, cadmium, arsenic, and antimony. It also covers copper, selenium, and zinc, which are all vital for a healthy immune system and for detoxification. I like that this test covers the worst heavy metals and helpful metals too.

For an overall toxic assessment of some of the worst chemicals, we offer an Environmental Pollutants Profile urine test. It covers some of the most common environmental pollutants, such as xylene, toluene, benzene, trimethylbenzene, styrene, phthalates, parabens, and methyl-tert-butyl ether. Often, people are unknowingly exposed to these chemicals from makeup, lotions, or sunscreens.
Another great value is the Personalized Amino Acid Health Assessment urine test. It is priced the same as our male and female panels. It provides an overview of health based on a detailed analysis of the major amino acids. It looks at your need for vitamins B6 and B12, folate, and magnesium. It assesses your susceptibility to vascular disease, abnormal intestinal microflora issues, malabsorption, impaired detoxification, neurological disorders, nitrogen insufficiency, excessive protein, and oxidative stress. It also provides a customized amino acid chart for daily oral dosages. It can provide great insight into what to focus on for maximum health benefits.

In fact, there was recently a recall of several sunscreens that were found to have high levels of benzene! So, it is a good idea to check periodically to make sure these chemicals are not increasing in your body.

**LE:** Are there any new hormone-related tests?

**Dr. Fogle:** We have now partnered with a new lab for our Complete Hormone & Urinary Metabolites Assessment Profile (HuMap). The new lab significantly expands the number of hormones and metabolites tested and has faster turnaround times. This urine profile tests a staggering 42 hormones and metabolites and also provides 17 ratios/calculations, which provide additional insight into what is going on at an individual level.

**LE:** Does it include cortisol and other stress markers?

**Dr. Fogle:** It does. Stress can affect all hormones, often decreasing their levels over time. Cortisol increases with stress to help the body deal with it, but then it decreases if the stress becomes chronic. This test provides a four-point cortisol and cortisone graph to see if levels are falling into a normal range. Some people have suppressed levels of cortisol in the morning, making it tough to get out of bed. Then they can have elevated cortisol at night which makes it difficult to go to sleep. The test also provides a helpful marker of overall oxidative stress.

**LE:** For people watching their wallets, what do you consider the best value for an overall health assessment?

**Dr. Fogle:** Without question, the Male Panel and Female Panel are our best value tests that cover a wide range of issues including cardiovascular, inflammation, hormones, immune, thyroid, vitamin D, iron, insulin/glucose, and magnesium status. Purchasing the same tests, without insurance, from a commercial lab, would cost over $2,000.

Another great value is the Personalized Amino Acid Health Assessment urine test. It is priced the same as our male and female panels. It provides an overview of health based on a detailed analysis of the major amino acids. It looks at your need for vitamins B6 and B12, folate, and magnesium. It assesses your susceptibility to vascular disease, abnormal intestinal microflora issues, malabsorption, impaired detoxification, neurological disorders, nitrogen insufficiency, excessive protein, and oxidative stress. It also provides a customized amino acid chart for daily oral dosages. It can provide great insight into what to focus on for maximum health benefits.

**LE:** Lately it seems like more and more people are impacted by allergies.

**Dr. Fogle:** Allergies cause a wide range of uncomfortable symptoms like sneezing, brain fog, sinus pain or pressure, skin reactions, gastrointestinal disturbances, and even depression.
Basically, there are two main ways allergy symptoms occur, caused by the antibodies IgE or IgG. In true allergies, the immune system produces IgE antibodies, which trigger the release of histamine that rapidly results in allergy symptoms. But the immune system can also react to allergens by producing IgG antibodies, which can cause inflammatory responses. This type of reaction often originates from foods we consume frequently and results in delayed symptoms 12 to 48 hours later and is considered a sensitivity versus an allergy. There are also food intolerances, such as lactose intolerance, autoimmune reactions like celiac disease, and reactions to dysbiotic microorganisms like Candida or lipopolysaccharides (LPS), molecules that coat bacteria.

All these possibilities make it challenging to figure out what is causing the reactions, and often there can be multiple ways in which a person is reacting. Testing the different ways can significantly improve the efficiency of a wellness plan and reveal what to avoid so the body can restore itself.

LE: That sounds complicated. Does Life Extension offer testing for all these types of reactions?

Dr. Fogle: Yes, we provide in-depth testing that covers the wide range of ways in which a person’s immune system can overreact. One of the new tests we are introducing this year is Respiratory Allergy IgE testing, which is for true allergies. Due to technological advances, this Respiratory Allergy IgE test can now be done from dried blood spots collected at home via a simple finger prick.

LE: Does this test cover the common allergies that cause symptoms for most people?

Dr. Fogle: Yes, it focuses on the most common offenders of allergy misery! It covers grasses, ragweed and other weeds, trees, molds, pets (dogs and cats), two types of the dreaded dust mites that are in our beds, feathers from different birds, the ubiquitous cockroach, and common house dust.

LE: What about food allergies?

Dr. Fogle: We offer tests for both food allergies and food sensitivities. True food allergies are easier to figure out because symptoms often start within minutes to hours of eating. But food allergies are less common than food sensitivities, which are harder to identify since the reaction can be hours to days later. We suggest most people start with food sensitivity testing. We offer three tiers of testing, from 96 foods to 240 foods for elevated IgG antibodies. Those who are especially sensitive to foods should consider our Elite Food Sensitivity Panel, which includes both IgG and IgA antibody testing. IgG is the more common way people react to foods adversely, but some people are extra sensitive and can also react by producing IgA antibodies.

LE: Everyone talks about gut health lately. Is there a way to test for leaky gut?

Dr. Fogle: Yes, this year we partnered with a new lab for a Gut Barrier Panel to test for intestinal barrier permeability issues, or “leaky gut.”
Previously, testing for gut permeability markers like *zonulin* was difficult because of its short half-life in the blood. To resolve this problem, the test looks at the **antibodies** that develop when zonulin leaks into the blood due to breaks in the gut barrier. This solution has since been applied to the gut permeability marker *occludin* as well. The antibodies have a longer half-life, which means they don’t degrade as quickly and are more reliable for testing.

The test also includes antibodies to Candida albicans, which is often an early sign of leaky gut. And most recently added is testing for LPS (lipopolysaccharide) antibodies. LPS is an extremely inflammatory molecule that comes from gram-negative bacteria. It creates significant inflammation, and antibodies against it indicate chronic LPS exposure, so they are not something you want to see in the blood.

**LE:** Is this Gut Barrier Panel a blood draw test?

**Dr. Fogle:** No, it is a simple finger-stick dried blood spot test done in the convenience of one’s home. Again, recent technology has allowed for some great new tests to be done this way.

**LE:** The subject of **biological age testing** is becoming extremely popular. More and more people are interested in finding out their biological age versus their chronological age. Does Life Extension offer a test for biological age?

**Dr. Fogle:** Yes, we now offer the **TruAge Complete Epigenetic Age Test**. We partnered with one of the best labs in the industry for calculating biological age. This lab is dedicated to perfecting their testing and algorithms through constant database analysis. They also partner with top educational institutions such as Harvard and Yale to license additional aging algorithms to further refine and perfect their biological age calculators. The test provides **three** different biological age reports because the testing and algorithms can be modified by different factors.

**LE:** Can you explain these three age reports?

**Dr. Fogle:** The test provides an **intrinsic biological age**, which is essentially a “pure” epigenetic aging assessment. To make the assessment even more accurate, it also provides an **extrinsic biological age**. This uses additional information derived from epigenetic changes in your immune cells as you age and your level of epigenetically determined immunosenescence (age-associated weakening of the immune system). The extrinsic age is the one you want to focus on the most, as it is the most complete biological age assessment.

The TruAge Complete Epigenetic Age Test also includes telomere testing to provide an **estimated telomere age** and compares your estimated telomere length to others of your same chronological age.

**LE:** What about the pace of aging? That is also a hot topic in the antiaging movement.

**Dr. Fogle:** Yes, testing can determine the **pace** you are currently aging, which is a combination of your genetics, current lifestyle modifications, stress levels, toxic exposures, exercise level, and so on. It looks at how you are aging **right now** and separates it from what you accumulated from your past or what you inherited. You want your rate of aging to be **below 1**. The farther **below 1**, the better. If your pace of aging is above 1, it is a signal that changes should be made as quickly as possible to slow down further aging.

The pace of aging test uses a unique algorithm created by Duke and Columbia Universities based on a study that followed the same individuals over time. It is also included in the TruAge Complete Epigenetic Age Test.

Overall, this assortment of innovative tests can allow you and your health care provider to make better and more informed decisions about your health.

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*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.
Revive Hair, Skin, and Nails from Within

For full product description and to order Hair, Skin & Nails Collagen Plus Formula, call 1-800-544-4440 or visit www.LifeExtension.com

Cynatine® is a registered trademark of Roxlor, LLC. VERISOL® and Bioactive Collagen Peptides® are registered trademarks of GELITA AG.

“I like what I see when I look in my mirror!”
Nancy
VERIFIED CUSTOMER REVIEW

The quickest way to betray your age is with a tired appearance...

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

Rejuvenating nutrients include:

- **VERISOL® Bioactive Collagen Peptides**—Stimulates the formation of new collagen and elastin to promote skin suppleness and elasticity¹

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

- **Biotin**—Supports nail strength and integrity²

- **Silicon**—For the formation of collagen and keratin molecules³

References

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

Item #02322 • 120 tablets
1 bottle $24.75 • 4 bottles $22.50 each

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Highlights from the International Society of Sports Nutrition Conference
Discoveries continue to be made about the best nutrition, diet, or exercise regimens for athletes.

At the 19th annual International Society for Sports Nutrition (ISSN) conference in 2022, scientists, doctors, and other leaders in the field gathered to share the latest research on what might improve health and fitness.

This article will discuss some of the highlights.
The Role of NAD⁺ in Muscle and Athletic Performance

NAD⁺ is a coenzyme found in every cell in the body, where it is crucial for facilitating energy production.³ Mounting evidence suggests that NAD⁺ plays an important role in muscle and athletic performance. ⬤ Mona Rosene, MS, RD, Global Director of Scientific Affairs at ChromaDex, discussed this relationship. ChromaDex was an innovator behind using the NAD⁺ precursor nicotinamide riboside to increase NAD⁺ levels. Low NAD⁺ levels have resulted in sarcopenia (loss of muscle mass and strength) in mice, but replenishing NAD⁺ restores muscle mass.⁴ In humans, even moderate resistance training was shown to significantly increase NAD⁺ levels.⁵

In a clinical study, older men received either 500 mg of nicotinamide riboside twice daily or a placebo. At 21 days, the treatment group had increased NAD⁺ metabolites in skeletal muscles, improved expression of muscle fiber protein genes, and lowered circulating levels of inflammatory cytokines. The placebo group was unchanged.⁶

In another clinical study, taking a different precursor from NAD⁺, nicotinamide mononucleotide, daily for six weeks improved aerobic capacity during exercise training.⁷

Benefits of Fasted Cardio

There has long been debate about the merits of fasted vs. fed cardio, or whether to do aerobic exercise on an empty stomach or after eating. ⬤ Dr. Guillermo Escalante, DSc, Professor of Kinesiology at California State University-San Bernardino, has studied the benefits of each. He estimates that about 60% of top bodybuilding competitors do fasted cardio, ideally in the morning, theoretically as a way to burn more fat.

Fasted cardio (doing aerobic exercise after an overnight fast) may indeed be more efficient at burning fat because it helps break down triglycerides into fatty acids. It may also increase the ability of mitochondria to use oxygen to make energy, among other benefits.¹

Dr. Escalante suggests that those who perform fasted cardio stick to low-to-moderate intensity workouts and do not exercise for more than 60 minutes due to potential loss of lean body mass.

Fasted exercise may also impede performance, which is why pre-exercise feeding is suggested for competitions. One way Dr. Escalante suggests potentially prolonging fasted exercise performance is to increase the percentage of calories you obtain from protein throughout the day.²
Creatine and Cognition

Dr. Scott Forbes, PhD, Professor in Physical Education Studies at Canada’s Brandon University, has conducted multiple clinical studies on creatine. This amino acid is commonly taken to promote muscle growth, but an accumulation of evidence suggests that it also plays an important role in brain health. Research shows:

- Creatine is created primarily in the kidneys and liver, but can also be synthesized in the brain and has some ability to cross the blood-brain barrier.
- Creatine deficiency syndrome disorders can cause learning delays and seizures, but these disorders are at least partially reversed by oral creatine intake.
- Brain creatine levels are reduced following mild traumatic brain injury. In children with these injuries, creatine intake improves recovery in cognition, communication, self-care, and more.
- Creatine use improves choice reaction time, balance, and mood in sleep-deprived patients.

In a clinical study led by Dr. Forbes, female athletes who took 3 grams of creatine daily for 28 days had a small but positive improvement in reaction time, a measure of cognitive performance, compared to placebo. Creatine may support cognition, however additional studies are needed.

Dr. Forbes also stressed creatine’s role in muscle health and the importance of a creatine loading phase (taking 20 grams or more daily for 5-7 days before switching to the regular dosage of 5 grams or more daily) during the initial stages of a resistance training program.

The Latest Research from the ISSN Conference

- Fasted cardio may burn fat more efficiently than fed cardio.
- Boosting levels of the coenzyme NAD+ may improve exercise performance and muscle strength.
- The amino acid creatine, taken to build muscle mass, also improves some measures of cognitive performance.
- Increasing nitric oxide in the body improves some measures of exercise performance.
Nitric Oxide Enhances Exercise

Dr. Andrew Jones, PhD, Professor of Applied Physiology at the U.K.’s University of Exeter, has closely studied the health benefits of the signaling molecule nitric oxide.

We need nitric oxide to control blood pressure and blood flow. Deficits of nitric oxide have been linked to exercise intolerance. Nitric oxide production is boosted in the body by consuming nitrates, nitrites, or the amino acid L-arginine, through diet or direct oral intake.

In Dr. Jones’s clinical research, obtaining nitrates from beetroot juice:

- Enhanced tolerance of high-intensity exercise and
- Improved reaction time during intermittent sprint exercises.

In a meta-analysis of 26 controlled trials, which included some of Dr. Jones’s work, nitrate intake decreased the amount of oxygen consumed during submaximal intensity exercise in healthy individuals. This means the amount of oxygen needed to perform the same exercise decreased, resulting in improved metabolic efficiency.

Obtaining nitrates or nitrites through processed meats can be harmful. But consuming vegetables high in nitrates or nitrites (such as lettuce, spinach, or beets) or taking the nitric oxide precursor L-arginine is associated with health benefits.

Summary

The scientists, doctors, and researchers at the International Society of Sports Nutrition conference revealed discoveries about fitness and sports nutrition that can benefit the general population.

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


45 Times Greater Bioavailability

CURCUMIN

Patented turmeric and fenugreek blend (500 mg) results in 45 times greater bioavailability of free curcuminoids.

Item #02407
500 mg, 60 vegetarian capsules
1 bottle $24 • 4 bottles $22 each

Same 500 mg potency of patented turmeric and fenugreek blend with added benefits of ginger and other turmeric actives.

Item #02324
500 mg curcumin + gingerol, 30 softgels
1 bottle $20 • 4 bottles $18 each

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

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Avocado

BY LAURIE MATHENA

For thousands of years, people native to Mexico and Central America have been benefiting from one of the healthiest fruits on the planet: the *avocado*.

More recently, studies highlighting these health benefits have paved the way for its soaring popularity in the U.S. as well.

In fact, the amount of avocados available per person (an indicator of consumption) *tripled* from 2000 to 2021.1

Avocados stand out from other fruits because of their unique nutrient profile, particularly their high amounts of healthy fat and protein.

One medium avocado provides **22 grams** of fat and **3 grams** of protein.2

Unlike harmful saturated fat, avocados contain **monounsaturated** and polyunsaturated fats,2 “good fats” known for reducing the risk of heart disease, inflammation, and cholesterol.

Consuming foods like avocados helps the body absorb fat-soluble nutrients like vitamin D, vitamin K, and vitamin E.2

Diets high in monounsaturated fats are especially beneficial for brain health. Avocado oil has been shown to boost BDNF (brain-derived neurotrophic factor). BDNF is a key protein that has been shown to improve memory and reduce the risk of age-related cognitive decline.3

Consuming one avocado per day has been shown to reduce the risk of heart disease by increasing beneficial HDL cholesterol,4 and by decreasing levels of oxidized LDL cholesterol.5

Despite the fact that avocados are high in calories (240 calories per medium avocado),2 consuming them on a regular basis has been shown to help promote weight loss, improve satiety, and decrease abdominal fat.

In one study, eating one avocado per day for three months decreased abdominal fat.6 In another, eating 32 grams (less than 1/3 of an avocado) per day was shown to help prevent weight gain.7

Eating avocado has also been associated with greater feelings of fullness and satiety, compared to eating a low-fat meal.8

Best of all, avocados are versatile and can easily fit into a healthy diet. Try some sliced on a piece of sprouted grain bread with a drizzle of olive oil, mash them up into a guacamole, or toss them in a smoothie.

References
When L-arginine is ingested, about 40% is degraded in the digestive tract by the arginase enzyme.

After absorption, arginine encounters further degradation, leaving little for conversion into nitric oxide.

A patented compound resists enzymatic decline to provide more bioavailable arginine.*

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

Mix one (1) stick pack of NitroVasc™ Boost in 8 oz of water for a tasty, berry-flavored drink. Drink on an empty stomach, or as recommended by a health care professional.

Item #02320
30 Stick Packs • Net Wt. 94.2 g/box

1 box $25.50
4 boxes $23.50 each

*Nitrosigine® is a registered trademark of Nutrition 21, LLC. Nitrosigine® is patent protected.

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TURN "ON" YOUR CELLULAR ENERGY

**OPTIMIZED NAD**

**WITH**

**RESVERATROL ELITE™**

NAD+ Cell Regenerator™ and Resveratrol Elite™
Item #02348
30 vegetarian capsules
1 bottle *

Resveratrol activates longevity proteins called sirtuins.
NAD+ enables cellular sirtuins to function.

Optimized NAD+ Cell Regenerator™ combines 300 mg of NIAGEN® nicotinamide riboside with bioavailable resveratrol and quercetin.

NAD+ Cell Regenerator™

NAD+ Cell Regenerator™ Item #02348
30 vegetarian capsules
1 bottle *

For those already taking resveratrol, we offer NAD+ Cell Regenerator™ that provides 300 mg of NIAGEN® nicotinamide riboside.

* For pricing available to readers of this magazine, call 1-800-544-4440 or visit LifeExtension.com/NAD

For full product description and to order NAD+ Cell Regenerator™ or NAD+ Cell Regenerator™ and Resveratrol Elite™, call 1-800-544-4440 or visit www.LifeExtension.com

NIAGEN® is a registered trademark of ChromaDex, Inc., Patents see: www.ChromaDexPatents.com

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Counting Sheep is So Passé

Sweet dreams, and no more sheep for you!

Immediate-release melatonin to help you get to sleep*

Extended-release melatonin to help you stay asleep*

With age, the body’s nocturnal peak of melatonin declines, making it harder to fall asleep and stay asleep.

Take Melatonin IR/XR at night for better bedtimes.

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

Item #02201
60 capsules

1 bottle $9
4 bottles $7.50 each

*or occasional sleeplessness.
CAUTION: Do not consume alcohol, drive or operate machinery after taking this product.
MicroActive® Melatonin is a registered trademark of Bioactives LLC.

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There is increasing awareness that age-associated memory loss and early-stage dementia are reversible conditions.1-3

Two compounds have been shown in clinical studies to help:4-10

• Protect cognitive function,
• Stop memory loss, and
• Potentially reverse early symptoms of cognitive decline.

Daily intake of the mineral lithium has been found to decrease the rate of cognitive decline in people with Alzheimer’s disease.4

And a milk-derived compound called proline-rich polypeptide complex has been shown to improve cognitive scores in Alzheimer’s patients.5

Both nutrients work by targeting harmful changes that occur in the brain with age.
Brain Changes and Dementia

The brain undergoes structural changes as we age.

Among the most damaging are the buildup of amyloid protein clumps, the dysfunction of tau proteins, and chronic inflammation.\(^{11}\)

Over time, these changes lead to the death and dysfunction of brain cells, which cause the brain to shrink.

This damage is associated with memory deficits seen with mild cognitive impairment and dementia.\(^{11}\)

The compounds lithium and proline-rich polypeptide complex help mitigate the progression of structural damage caused by amyloid and tau that occurs in aging brains.

Lithium Preserves Mental Function

Animal and human studies have shown that low-dose lithium works in key ways to guard against harmful changes in the brain by:

- Improving the brain’s ability to clear toxic amyloid protein clumps,\(^{12}\)
- Reducing amyloid plaque and abnormal tau protein in the brain (longer term intake),\(^{13}\)
- Improving cellular housekeeping (autophagy), mitochondrial function, and the production of brain growth factors, and\(^{14}\)
- Potentially preserving brain volume in multiple regions, including the hippocampus, which is critical for the formation of new memories.\(^{15}\)

In a clinical study, a daily 300 mcg micro-dose of lithium for 15 months significantly decreased the progression of cognitive decline in patients with Alzheimer's disease.\(^{7}\)

In a randomized clinical trial of older adults with mild cognitive impairment, participants received either lithium or a placebo for two years. This group was followed for an additional two years.

Researchers found that after two years, cognitive function remained stable in those taking low-dose lithium, with better performance on memory and attention tasks. The placebo group showed a significant functional and cognitive decline.

Another study showed that long-term, low-dose lithium attenuates cerebrospinal fluid biomarkers for Alzheimer's disease.\(^{4}\)

After four years, the progression of mild cognitive impairment to dementia was lower in those taking low-dose lithium compared to a placebo.\(^{4}\)

Proline-Rich Polypeptides Fight Brain Aging

Another nutrient that can help aging brains resist damaging structural changes is the proline-rich polypeptide complex. This is a compound isolated from protein fragments found in colostrum (the early milk that mothers produce after a baby is born).

Proline-rich polypeptide complex has been shown to:

- Provide neuroprotective effects in vitro,\(^{16}\)
- Increase the growth of nerve fibers and support connectivity in the brain,\(^{17,18}\)
- Stabilize cognitive function in a clinical trial of patients with mild and moderate Alzheimer’s disease,
- Enhance the production of enzymes that break down and eliminate amyloid beta protein, and
- Alter the expression of genes associated with inflammation, the production of amyloid, and the abnormal modification of tau proteins.\(^{10}\)

In a human trial, subjects with early-stage Alzheimer's disease received either a proline-rich polypeptide complex or a placebo.\(^{5}\)

After one year, those in the placebo group had a significant reduction in scores on a test of cognitive function, indicating worsening impairment.
Patients with an Alzheimer’s diagnosis typically deteriorate over any period of observation. To see an improvement in cognitive function is exceptional.

A remarkable 54% of these early-stage Alzheimer’s patients taking the polypeptide complex had improvements in their cognitive scores. The remainder were stable, without any worsening of cognitive function.

Those who had milder symptoms at the start of the study showed the greatest improvement on average. This suggests that taking the complex early in the course of the disease is most beneficial.

Summary

Low doses of the trace mineral lithium and a proline-rich polypeptide complex can prevent or delay the structural damage that occurs in aging brains.

Human studies demonstrate the ability of these nutrients to stabilize or even reverse signs of cognitive dysfunction in people with early cognitive impairment and Alzheimer’s disease.

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

References


"It gives my immune system an extra kick when needed."

Tina
VERIFIED CUSTOMER REVIEW

You know zinc is good for you—but are you getting enough?

Zinc promotes critical immune functions and healthy bones.

This formula provides 50 mg of zinc in a convenient, vegetarian capsule.

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

OptiZinc® is a Lonza trademark, registered in the USA.

Caution: Supplemental zinc can inhibit the absorption and availability of copper. If more than 50 mg of supplemental zinc is to be taken daily for more than four weeks, 2 mg of supplemental copper should also be taken to prevent copper deficiency.
RESTORE YOUTHFUL GUT BALANCE

With Strawberry Flavored FLORASSIST® Prebiotic Chewable

Item #02203 • 60 vegetarian chewable tablets

1 bottle $15.75 • 4 bottles $14 each

With age, our bifidobacteria levels decline to as little as 5%, creating gut imbalance.¹

Increasing bifidobacteria levels enhances digestion and carbohydrate metabolism.

Strawberry flavored FLORASSIST® Prebiotic Chewable helps restore healthy bifidobacteria levels in as little as 14 days using XOS prebiotic.²

1,000 mg of XOS (xylooligosaccharides) per prebiotic chewable.

References

PreticX™ is a registered trademark of AIDP, Inc.

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

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With age, dopamine levels decline due to the increase of the MAO-B enzyme. Amur Cork Tree (Phellodendron bark) can help preserve dopamine by inhibiting MAO-B activity. Dopamine Advantage provides 500 mg of Amur Cork Tree and 500 mcg of Vitamin B12 in each capsule.

Dopamine, the “feel good” neurotransmitter, regulates motivation, mood, movement, and cognitive function.

Feel Better, THINK More Clearly

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

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Your Best Memories Are in Front of You

Dancing. Laughing. Smiling. These are your special moments ... and they should be memories you will cherish for many years to come.

Memory Protect is one of the most advanced memory and brain health supplement ever. It combines colostrinin, a milk peptide, with the trace mineral lithium for unrivaled memory and cognitive health support for your brain.

So live life your way. We'll help you safeguard those precious moments with Memory Protect!

Item #02101 • 36 vegetarian capsules
1 box $18 • 4 boxes $16 each
36-DAY SUPPLY.
Contains milk.

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

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A Therapeutic Foot Massage with every step

Wearing Kenkohs daily, even for short periods, can help improve blood circulation, keep your body aligned, relieve pain in the feet, ankles, knees, legs, hips and back, reduce swelling, relieve stress and enhance your overall mood. Kenkoh revitalizes and rejuvenates your whole body!

“Massage improves Circulation…”
UNIVERSITY OF MIAMI SCHOOL OF MEDICINE

“Massage aids muscle recovery and speeds recovery times…”
McMASTER UNIVERSITY, ONTARIO

“A daily foot massage lowers blood pressure and lowers triglyceride levels…”
Pusan National University, South Korea

Relieve pain & improve your health now!

Take the 14 day Kenkoh challenge

HappyFeet.com/KENKOH
1-800-336-6657
Kenkoh®
The Original Massage Sandal
Good Things Come in Pairs

- **THE CHALLENGE:** How to fit meaningful potencies into one easy-to-swallow capsule?

- **THE SOLUTION:** Two-Per-Day... a diverse array of bioactive nutrients.

### Two-Per-Day Multivitamin Tablets

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<th>Item #</th>
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<th>Price</th>
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Each bottle provides a two-month supply.

### Two-Per-Day Multivitamin Capsules

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

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**TWO-PER-DAY Multivitamin provides:**

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<tr>
<th>Vitamin</th>
<th>Dosage</th>
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<tr>
<td>A (beta-carotene, and acetate)</td>
<td>5,000 IU</td>
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<tr>
<td>D3 (cholecalciferol)</td>
<td>2,000 IU</td>
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<td>C (ascorbic acid, calcium and niacinamide ascorbates)</td>
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<td>E (67 mg D-alpha tocopheryl succinate, D-alpha tocopherol)</td>
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<td>E (gamma, delta, alpha, beta tocopherols)</td>
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<td>B1 (thiamine HCl)</td>
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<td>B2 (riboflavin 5'-phosphate)</td>
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<td>B3 (niacinamide, niacinamide ascorbate)</td>
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<td>B5 (D-calcium pantothenate)</td>
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<td>Folate (5-MTHF)</td>
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<td>Marigold extract [std. to 5 mg trans-lutein, 155 mcg trans-zeaxanthin]</td>
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<td>Lycopene [LycoBeads® natural tomato extract (fruit)]</td>
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<td>Selenium [as sodium selenite, SeleniumExcel® high selenium yeast, Se-methyl L-selenocysteine]</td>
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For complete list of ingredients and dosages, visit www.LifeExtension.com

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CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.


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7  WHY WE TEST INSULIN BLOOD LEVELS
Elevated blood insulin can identify correctable glucose control issues before type II diabetes manifests.

24  EASY WAY TO BOOST FIBER INTAKE
Fiber from the konjac plant provides same benefits as other fibers, but at a lower dose.

32  ACTIVATE YOUR FAT-BURNING ENZYME!
Studies show that G. pentaphyllum and hesperidin help activate AMPK while slashing abdominal fat.

40  SENESCENT CELLS AND THE BRAIN
Senescent cells in the brain impair cognitive functions. Senolytic compounds reduce the senescent cell burden.

48  RELIEF FROM MENOPAUSE SYMPTOMS
Widely used in Germany, Siberian rhubarb extract relieves 11 common symptoms of menopause without hormones.

57  CUTTING-EDGE LAB TESTS
Innovative lab tests provide specialized information on hormones, food sensitivity, and biological age.