



The Science of a Healthier Life®

LifeExtension.com

June 2023

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* *Gerontology*. 1996;42(3):170-80.

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

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Why We Test Insulin Blood Levels



WILLIAM FALOON

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 expectancy*¹ and *increased risks of cancer*²⁻⁵ 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

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* **morbidity**s 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.

Know Your GLYCEMIC BLOOD MARKERS

Target Interventions to Achieve:

Fasting Glucose → **80 to 86 mg/dL**

Fasting Insulin → **<5 µIU/mL**

Hemoglobin A1c → **5.0 to 5.4%**



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**^{28,29} and other pathologies that contribute to chronic kidney disease.^{21,32}

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**^{33,34} and **kidney failure**.^{35,36}

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 μ U/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.³⁷

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**^{38,39} and/or an **SGLT2 inhibitor**^{40,41} 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.^{42,43}

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 μ U/mL** and extends to a startling high of **24.9 μ U/mL**.⁴⁴

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

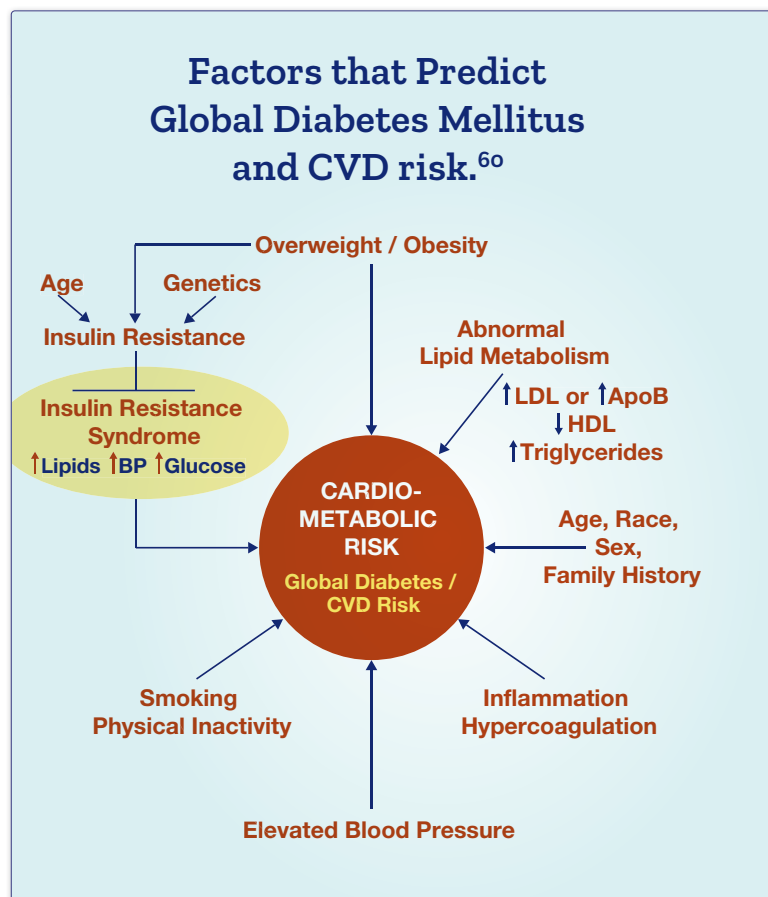
Today's laboratory reference ranges don't define **hyperinsulinemia** until **fasting insulin** rises above **24.9 μ U/mL**. This is **3-to-5-times** *higher* than what we consider optimal.

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.”⁴⁵

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.⁴²

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.



Why the controversy?

Life Extension® has published articles over the decades about the disease risks associated with excess fasting insulin.

Yet there are inconsistencies in the literature and in medical opinion as to what levels of fasting insulin increase disease risks.

One impediment in reaching consensus is varying definitions.

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 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.

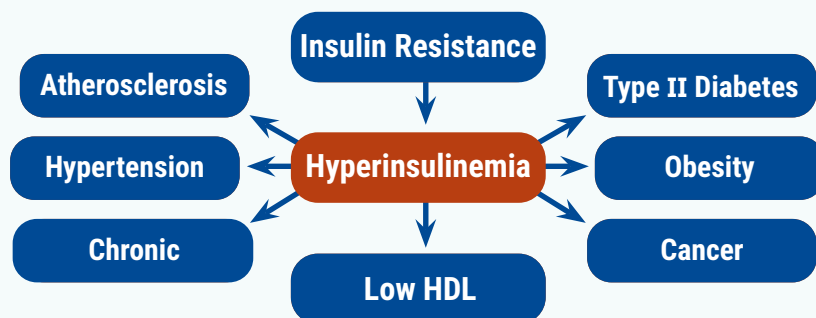
Even thin people can suffer from insulin resistance, which is another reason for testing blood for **fasting insulin**.

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 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®



Cellular Insulin Resistance

The cells of many people with impaired glycemic control tend to be more resistant to insulin-stimulated **glucose uptake** than those with normal glucose tolerance.

The ability of **insulin** to stimulate cellular **glucose uptake** varies widely among individuals.

Resistance to **insulin-stimulated** glucose uptake and compensatory **hyperinsulinemia** represents a basic defect in many patients in the *early* stage of **type II diabetes**.¹

As the condition worsens, insulin-producing pancreatic cells fail, thus some type II diabetics to require **insulin injections**.¹

Increases in pancreatic **insulin production** can temporarily prevent elevations of **glucose** and **A1c**. This does not mean that this compensatory (hyperinsulinemic) response is benign.

Early-stage diabetic development (and related complications) is predictable by including **fasting insulin** with conventional **blood test** panels.

References

- Kolb H, Kempf K, Röhling M, et al. Insulin: too much of a good thing is bad. *BMC Medicine*. 2020 20(20):224.
- Gallagher EJ, LeRoith D. Hyperinsulinaemia in cancer. *Nat Rev Cancer*. 2020 Nov;20(11):629-44.
- Dugnani E, Balzano G, Pasquale V, et al. Insulin resistance is associated with the aggressiveness of pancreatic ductal carcinoma. *Acta Diabetol*. 2016 Dec;53(6):945-56.
- Sun W, Lu J, Wu S, et al. Association of insulin resistance with breast, ovarian, endometrial and cervical cancers in non-diabetic women. *Am J Cancer Res*. 2016;6(10):2334-44.
- Lofffield E, Freedman ND, Lai GY, et al. Higher Glucose and Insulin Levels Are Associated with Risk of Liver Cancer and Chronic Liver Disease Mortality among Men without a History of Diabetes. *Cancer Prev Res (Phila)*. 2016 Nov;9(11):866-74.
- de Rooij SR, Dekker JM, Kozakova M, et al. Fasting insulin has a stronger association with an adverse cardiometabolic risk profile than insulin resistance: the RISC study. *Eur J Endocrinol*. 2009 Aug;161(2):223-30.
- Zhang X, Li J, Zheng S, et al. Fasting insulin, insulin resistance, and risk of cardiovascular or all-cause mortality in non-diabetic adults: a meta-analysis. *Biosci Rep*. 2017 Oct 31;37(5).
- Ormazabal V, Nair S, Elfeky O, et al. Association between insulin resistance and the development of cardiovascular disease. *Cardiovasc Diabetol*. 2018 Aug 31;17(1):122.
- Gutch M, Kumar S, Razi SM, et al. Assessment of insulin sensitivity/resistance. *Indian J Endocrinol Metab*. 2015 Jan-Feb;19(1):160-4.
- Available at: https://www.uptodate.com/contents/clinical-presentation-diagnosis-and-initial-evaluation-of-diabetes-mellitus-in-adults?search=hb%20A1c%20test&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1. Accessed March, 8, 2023.
- Thomas DD, Corkey BE, Istfan NW, et al. Hyperinsulinemia: An Early Indicator of Metabolic Dysfunction. *Journal of the Endocrine Society*. 2019;3(9):1727-47.
- McLarty RP, Allooye JP, Chiterna GG, et al. Glycemic control, associated factors, acute complications of Type 1 Diabetes Mellitus in children, adolescents and young adults in Tanzania. *Endocrinology, Diabetes & Metabolism*. 2021;4(2):e00200.
- Ali MK, Bullard KM, Saydah S, et al. Cardiovascular and renal burdens of prediabetes in the USA: analysis of data from serial cross-sectional surveys, 1988-2014. *Lancet Diabetes Endocrinol*. 2018 May;6(5):392-403.
- Park C, Guallar E, Linton JA, et al. Fasting glucose level and the risk of incident atherosclerotic cardiovascular diseases. *Diabetes Care*. 2013 Jul;36(7):1988-93.
- Brutsaert EF, Shitole S, Biggs ML, et al. Relations of Postload and Fasting Glucose With Incident Cardiovascular Disease and Mortality Late in Life: The Cardiovascular Health Study. *J Gerontol A Biol Sci Med Sci*. 2016 Mar;71(3):370-7.
- Giri B, Dey S, Das T, et al. Chronic hyperglycemia mediated physiological alteration and metabolic distortion leads to organ dysfunction, infection, cancer progression and other pathophysiological consequences: An update on glucose toxicity. *Biomedicine & Pharmacotherapy*. 2018 2018/11/01;107:306-28.
- Available at: <https://www.cdc.gov/diabetes/managing/problems.html#:~:text=Common%20diabetes%20health%20complications%20include,how%20to%20improve%20overall%20health>. Accessed March 9, 2023, 2023.
- Röhling M, Kempf K, Kolb H, et al. The Epidemiological Boehringer Ingelheim Employee Study (Part 3): Association of Elevated Fasting Insulin Levels but Not HOMA-IR With Increased Intima Media Thickness and Arteriosclerosis in Middle-Aged Persons. *Front Cardiovasc Med*. 2021;8:752789.
- de Rooij SR, Dekker JM, Kozakova M, et al. Fasting insulin has a stronger association with an adverse cardiometabolic risk profile than insulin resistance: the RISC study. *Eur J Endocrinol*. 2009 Aug;161(2):223-30.
- Available at: <https://www.cdc.gov/diabetes/basics/insulin-resistance.html>. Accessed March, 9, 2023.
- Ahmed B, Sultana R, Greene MW. Adipose tissue and insulin resistance in obese. *Biomedicine & Pharmacotherapy*. 2021 2021/05/01;137:111315.
- Available at: <https://www.cdc.gov/media/releases/2021/p0824-youth-diabetes.html>. Accessed March, 7, 2023.
- Faruque S, Tong J, Lacmanovic V, et al. The Dose Makes the Poison: Sugar and Obesity in the United States - a Review. *Pol J Food Nutr Sci*. 2019;69(3):219-33.
- ter Horst KW, Gijlmanse PW, Koopman KE, et al. Insulin resistance in obesity can be reliably identified from fasting plasma insulin. *Int J Obes (Lond)*. 2015 Dec;39(12):1703-9.
- Adeva-Andany MM, Martinez-Rodriguez J, Gonzalez-Lucan M, et al. Insulin resistance is a cardiovascular risk factor in humans. *Diabetes Metab Syndr*. 2019 Mar-Apr;13(2):1449-55.
- Park SK, Jung JY, Choi WJ, et al. Elevated fasting serum insulin level predicts future development of hypertension. *Int J Cardiol*. 2014 Mar 15;172(2):450-5.
- Zhou MS, Wang A, Yu H. Link between insulin resistance and hypertension: What is the evidence from evolutionary biology? *Diabetol Metab Syndr*. 2014 Jan 31;6(1):12.
- Reaven GM, Knowles JW, Leonard D, et al. Relationship between simple markers of insulin resistance and coronary artery calcification. *J Clin Lipidol*. 2017 Jul-Aug;11(4):1007-12.
- Fakhrzadeh H, Sharifi F, Alizadeh M, et al. Relationship between insulin resistance and subclinical atherosclerosis in individuals with and without type 2 diabetes mellitus. *J Diabetes Metab Disord*. 2015;15:41.
- Janus A, Szahidewicz-Krupska E, Mazur G, et al. Insulin Resistance and Endothelial Dysfunction Constitute a Common Therapeutic Target in Cardiometabolic Disorders. *Mediators Inflamm*. 2016 2016/06/20;2016:3634948.
- Westergren HU, Svedlund S, Momo RA, et al. Insulin resistance, endothelial function, angiogenic factors and clinical outcome in non-diabetic patients with chest pain without myocardial perfusion defects. *Cardiovasc Diabetol*. 2016 Feb 19;15(1):36.
- da Silva AA, do Carmo JM, Li X, et al. Role of Hyperinsulinemia and Insulin Resistance in Hypertension: Metabolic Syndrome Revisited. *Can J Cardiol*. 2020 May;36(5):671-82.
- Bornfeldt KE, Tabas I. Insulin resistance, hyperglycemia, and atherosclerosis. *Cell Metab*. 2011 Nov 2;14(5):575-85.
- Kirk EP, Klein S. Pathogenesis and pathophysiology of the cardiometabolic syndrome. *J Clin Hypertens (Greenwich)*. 2009 Dec;11(12):761-5.
- Oishi Y, Manabe I. Organ System Crosstalk in Cardiometabolic Disease in the Age of Multimorbidity. *Front Cardiovasc Med*. 2020;7:64.
- Yerram P, Karuparthi PR, Saab G, et al. The cardiometabolic syndrome and chronic kidney disease. *Current Cardiovascular Risk Reports*. 2008 2008/03/01;2(2):95-100.
- Castro-Barquero S, Ruiz-León AM, Sierra-Pérez M, et al. Dietary Strategies for Metabolic Syndrome: A Comprehensive Review. *Nutrients*. 2020 Sep 29;12(10).
- Lu Z, Guo Y. Metformin and Its Benefits for Various Diseases. *Front Endocrinol (Lausanne)*. 2020;11:191.
- Szymczak-Pajor I, Wenclewska S, Śliwińska A. Metabolic Action of Metformin. *Pharmaceuticals (Basel)*. 2022 Jun 30;15(7).
- Ni L, Yuan C, Chen G, et al. SGLT2i: beyond the glucose-lowering effect. *Cardiovasc Diabetol*. 2020 Jun 26;19(1):98.
- Xu B, Li S, Kang B, et al. The current role of sodium-glucose cotransporter 2 inhibitors in type 2 diabetes mellitus management. *Cardiovasc Diabetol*. 2022 May 25;21(1):83.
- Ghanavati M, Rahmani J, Rinaldi G, et al. Fasting Insulin and Risk of Cancer Related Mortality in Non-diabetic Adults: A Dose-response Meta-analysis of Cohort Studies. *Curr Diabetes Rev*. 2020;16(4):357-63.
- Goodwin PJ, Ennis M, Bahl M, et al. High insulin levels in newly diagnosed breast cancer patients reflect underlying insulin resistance and are associated with components of the insulin resistance syndrome. *Breast Cancer Res Treat*. 2009 Apr;114(3):517-25.
- Available at: <https://www.labcorp.com/tests/004333/insulin>. Accessed March 9, 2023.
- Argirion I, Weinstein SJ, Mannisto S, et al. Serum Insulin, Glucose, Indices of Insulin Resistance, and Risk of Lung Cancer. *Cancer Epidemiol Biomarkers Prev*. 2017 Oct;26(10):1519-24.
- Zhang AMY, Wellberg EA, Kopp JL, et al. Hyperinsulinemia in Obesity, Inflammation, and Cancer. *Diabetes Metab J*. 2021 May;45(3):285-311.
- Walraven I, van 't Riet E, Stehouwer CD, et al. Fasting proinsulin levels are significantly associated with 20 year cancer mortality rates. The Hoorn Study. *Diabetologia*. 2013 May;56(5):1148-54.
- Tsujimoto T, Kajio H, Sugiyama T. Association between hyperinsulinemia and increased risk of cancer death in nonobese and obese people: A population-based observational study. *Int J Cancer*. 2017 Jul 1;141(1):102-11.
- Diabetes Prevention Program Research G. Long-term effects of lifestyle intervention or metformin on diabetes development and microvascular complications over 15-year follow-up: the Diabetes Prevention Program Outcomes Study. *Lancet Diabetes Endocrinol*. 2015 Nov;3(11):866-75.
- Ethan M, Balk M, MPH, Amy Earley, BS, Gowri Raman, MD, MS, Esther A. Avendano, BA, Anastassios G. Pittas, MD, MS, and Patrick L. Remington, MD, MPH Combined Diet and Physical Activity Promotion Programs to Prevent Type 2 Diabetes Among Persons at Increased Risk: A Systematic Review for the Community Preventive Services Task Force. *Annals of Internal Medicine*. 2015;163(6):437-51.
- Munir KM, Chandrasekaran S, Gao F, et al. Mechanisms for food polyphenols to ameliorate insulin resistance and endothelial dysfunction: therapeutic implications for diabetes and its cardiovascular complications. *Am J Physiol Endocrinol Metab*. 2013 Sep 15;305(6):E679-86.
- Mirabella M, Chieffi E, Arcidiacono B, et al. Mediterranean Diet Nutrients to Turn the Tide against Insulin Resistance and Related Diseases. *Nutrients*. 2020 Apr 12;12(4).
- Yaribeygi H, Atkin SL, Simental-Mendia LE, et al. Molecular mechanisms by which aerobic exercise induces insulin sensitivity. *J Cell Physiol*. 2019 Aug;234(8):12385-92.
- Hawley JA, Lessard SJ. Exercise training-induced improvements in insulin action. *Acta Physiol (Oxf)*. 2008 Jan;192(1):127-35.
- Herman R, Kravos NA, Jensterle M, et al. Metformin and Insulin Resistance: A Review of the Underlying Mechanisms behind Changes in GLUT4-Mediated Glucose Transport. *Int J Mol Sci*. 2022 Jan 23;23(3).
- Mima A. Sodium-Glucose Cotransporter 2 Inhibitors in Patients with Non-Diabetic Chronic Kidney Disease. *Adv Ther*. 2021 May;38(5):2201-12.
- Tobe K, Sukanami H, Kaku K. Sodium-glucose cotransporter 2 inhibitor, tofogliflozin, shows better improvements of blood glucose and insulin secretion in patients with high insulin levels at baseline. *J Diabetes Investig*. 2018 Jul;9(4):862-9.
- Okura T, Fujioka Y, Nakamura R, et al. The sodium-glucose cotransporter 2 inhibitor ipragliflozin improves liver function and insulin resistance in Japanese patients with type 2 diabetes. *Sci Rep*. 2022 Feb 3;12(1):1896.
- Esterline RL, Vaag A, Oscarsson J, et al. MECHANISMS IN ENDOCRINOLOGY: SGLT2 inhibitors: clinical benefits by restoration of normal diurnal metabolism? *Eur J Endocrinol*. 2018 Apr;178(4):R113-R25.
- Kahn R. Metabolic Syndrome. *Circulation*. 2007;115(13):1806-11.

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Commercial labs charge over \$2,000 for blood tests needed to evaluate cardiac, inflammatory, immune, and other degenerative risk factors.

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Regular Price: \$299
Sale Price: \$224



LAB TEST SALE
ENDS JULY 10, 2023

MALE PANEL

GLUCOSE PROFILE

Insulin
Hemoglobin A1c
Glucose

CARDIAC MARKERS

C-Reactive Protein (high sensitivity)
Apolipoprotein B (ApoB)
Homocysteine
Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

MINERALS

Magnesium (serum)
Ferritin (measure of iron status)
Calcium
Potassium
Phosphorus
Sodium
Iron
Chloride

ORGAN FUNCTION

Kidney: creatinine, BUN, uric acid, BUN/creatinine ratio
Liver: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

COMPLETE BLOOD COUNT (CBC)

Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
Immune Cells including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Red Blood Cells including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
Platelets

HORMONES

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

CANCER MARKER

PSA (Prostate Specific Antigen)

FEMALE PANEL

GLUCOSE PROFILE

Insulin
Hemoglobin A1c
Glucose

CARDIAC MARKERS

C-Reactive Protein (high sensitivity)
Apolipoprotein B (ApoB)
Homocysteine
Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

MINERALS

Magnesium (serum)
Ferritin (measure of iron status)
Calcium
Potassium
Phosphorus
Sodium
Iron
Chloride

ORGAN FUNCTION

Kidney: creatinine, BUN, uric acid, BUN/creatinine ratio
Liver: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase

COMPLETE BLOOD COUNT (CBC)

Blood proteins: albumin, globulin, total protein, albumin/globulin ratio
Immune Cells including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Red Blood Cells including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
Platelets

HORMONES

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

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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.

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on ALL
Lab Tests



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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:

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FT. LAUDERDALE, FL, 33304**

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MALE AND FEMALE PANELS

- | | SALE PRICE |
|---|--------------|
| <input type="radio"/> 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 | \$224 |
| <input type="radio"/> 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 | \$224 |

CARDIAC RISK ASSESSMENTS

- | | |
|---|-----------------|
| <input type="radio"/> 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. | \$74.25 |
| <input type="radio"/> NMR LIPOPROFILE PLUS* (LC100049)
In-depth analysis of cardiovascular risk markers including: NMR LipoProfile, C-Reactive Protein, Myeloperoxidase , and Oxidized LDL . | \$201.75 |
| <input type="radio"/> 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. | \$56.25 |
| <input type="radio"/> 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. | \$74.25 |
| <input type="radio"/> 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. | \$198.75 |
| <input type="radio"/> OMEGA-3 INDEX COMPLETE** (LC100066)
Beneficial for everyone! People <u>not</u> 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. | \$74.25 |

CONDITION-SPECIFIC TESTS

- | | |
|--|-----------------|
| <input type="radio"/> PERSONALIZED AMINO ACID HEALTH ASSESSMENT** (LC100090)
An in-depth analysis of amino acid metabolism provides insight into various health concerns, such as maldigestion, GI dysbiosis, neurological issues and more, with a personalized report of diet and supplementation suggestions. Provided as an at-home urine collection kit. | \$224.25 |
| <input type="radio"/> ENVIRONMENTAL POLLUTANTS PROFILE*** (LC100089)
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. | \$111.75 |

Know YOUR NUMBERS



- | | SALE PRICE |
|--|------------|
| <p>○ BLOOD METALS PANEL BLOOD SPOT KIT *** (LC100092) \$123.75</p> <p>Convenient at-home test for blood levels of 8 important metals, providing insight into toxic metal burden and nutritional status with a quick and easy finger stick. Detects toxic metals: Lead, Mercury, Cadmium, Arsenic, Antimony and nutritional elements: Copper, Zinc, Selenium</p> | |
| <p>○ TOXIC METALS PANEL (FECAL)*** (LC100076) \$127.50</p> <p>The results of fecal elemental analysis can help you identify and eliminate dietary exposure to toxic metals, while also assessing the body's natural excretion of metals. The panel tests Antimony, Arsenic, Beryllium, Bismuth, Cadmium, Copper, Lead, Mercury, Nickel, Platinum, Thallium, Tungsten, and Uranium.</p> | |
| <p>○ NEUROTRANSMITTER PANEL-COMPREHENSIVE*** (LC100085) \$221.25</p> <p>Serotonin, Dopamine, Epinephrine, Norepinephrine, GABA, Glutamate, Glycine, Histamine, PEA, DOPAC, 3-MT, Normetanephrine, Metanephrine, 5-HIAA, Tryptamine, Tyrosine, Tyramine, Taurine. Alterations in neurotransmitters play a significant role in contributing to symptoms such as cognitive disorders, depression, anxiety, diminished drive, fatigue and sleep difficulties, craving, addictions, pain, and more.</p> | |
| <p>○ PRO7 ADVANCED NUTRIGENOMIC PROFILE** (LC100097) \$224.25</p> <p>Analyzes genetics in 7 key areas of health (methylation, neurotransmitters, mitochondrial health, detoxification, inflammation, and more) and provides genetically targeted nutritional suggestions.</p> | |
| <p>○ APOE GENETIC TEST FOR ALZHEIMER'S AND CARDIAC RISK** (LC100059) \$111.75</p> <p>This simple at-home cheek swab reveals your ApoE genotype and association with risk of Alzheimer's and cardiovascular disease.</p> | |
| <p>○ FOOD SENSITIVITY PANEL-ELITE*** (LC100096) \$336.75</p> <p>This in-depth food sensitivity assessment measures both IgG and IgA response to 240 foods.</p> | |
| <p>○ GUT BARRIER PANEL** (LC900004) NEW \$123.75</p> <p>Measure immune response (IgG/C3d & IgA) to three key GI markers associated with intestinal permeability and leaky gut: Candida, Zonulin, and Occludin.</p> | |

GUT MICROBIOME TESTING

- | | |
|---|--|
| <p>○ CPP STOOL ANALYSIS (CPP) *** (LC100093) \$224.25</p> <p>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.</p> | |
| <p>○ COMPREHENSIVE STOOL ANALYSIS (CSAP) *** (LC100083) \$299.25</p> <p>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.</p> | |
| <p>○ GI360™ *** STOOL ANALYSIS (LC100088) \$379.25</p> <p>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.</p> | |

WHOLE-BODY HEALTH

- | | SALE PRICE |
|--|------------|
| <p>○ MALE ELITE PANEL* (LC100016) \$431.25</p> <p>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 • IGF-1 • SHBG • Free and Total PSA • Vitamin D 25-OH • hs-CRP • Ferritin • TIBC • Homocysteine • Insulin • Hemoglobin A1c • Cortisol • ApoB • Magnesium</p> | |
| <p>○ MALE BASIC HORMONE PANEL (LC100012) \$56.25</p> <p>DHEA-S • Estradiol • Total and Free Testosterone • PSA</p> | |
| <p>○ FEMALE ELITE PANEL* (LC100017) \$431.25</p> <p>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 • IGF-1 • SHBG • Vitamin D 25-OH • hs-CRP • Ferritin • TIBC • Homocysteine • Insulin • Hemoglobin A1c • Cortisol • ApoB • Magnesium</p> | |
| <p>○ FEMALE BASIC HORMONE PANEL (LC100013) \$56.25</p> <p>DHEA-S • Estradiol • Total and Free Testosterone • Progesterone</p> | |
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| <p>○ COMPLETE HORMONE & METABOLITES PROFILE (HUMAP)***† (LC900001) \$224.25</p> <p>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.</p> | |

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LIVER FUNCTION

AST (SGOT) • ALT (SGPT) • LDH • Total Bilirubin • Alkaline phosphatase

KIDNEY FUNCTION

BUN • Creatinine • BUN/Creatinine Ratio • Uric Acid

BLOOD PROTEINS

Total Protein • Albumin • Globulin • Albumin/Globulin Ratio

BLOOD COUNTS

Red Blood Cell Count • White Blood Cell Count • Eosinophils Neutrophils (Absolute) • Lymphs (Absolute) • Eos (Absolute) Baso (Absolute) • RDW • Monocytes (Absolute) • Monocytes Lymphocytes • Platelet Count • Hemoglobin • Hematocrit MCV • MCH • MCHC • Neutrophils

BLOOD MINERALS

Calcium • Potassium • Sodium • Chloride • Iron

The price for the **CBC/Chemistry/Lipids Panel** alone is **\$26.25**. (LC381822)

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

* This test requires samples to be shipped to the lab on dry ice for customers using a Blood Draw Kit. Customer is responsible for obtaining dry ice.

** This test is packaged as a kit.

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In the News



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

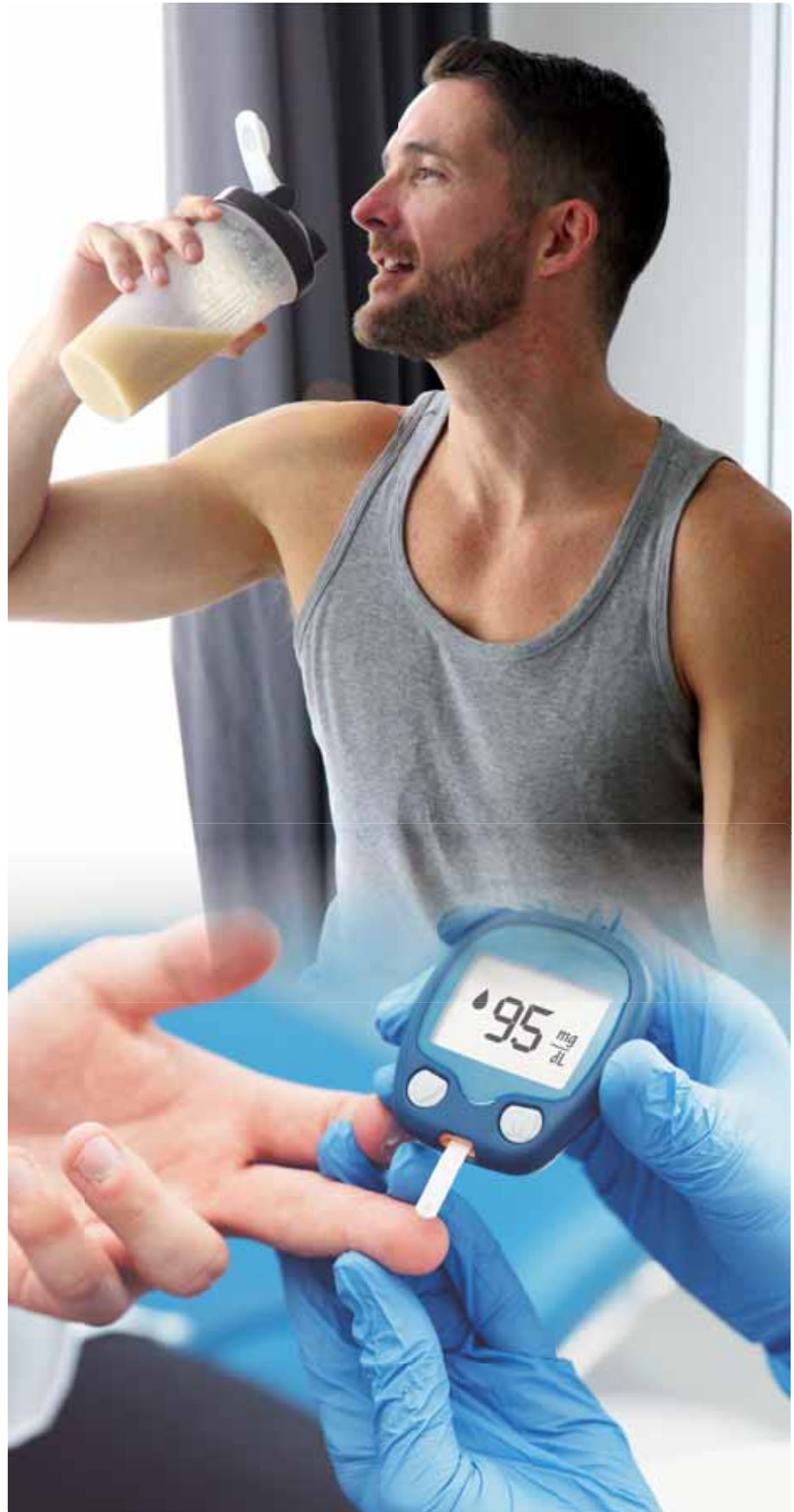
Consuming a large dose of whey protein before meals improves glucose control among type II diabetics, according to a study published in *BMJ Open Diabetes Research & Care*.*

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.

* *BMJ Open Diabetes Res Care*. 2022 May;10(3):e002820.





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.

1. *JAMA Netw Open*. 2023;6(1):e2250681.
2. *Obesity*. 2012;20(7):1444-8.

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





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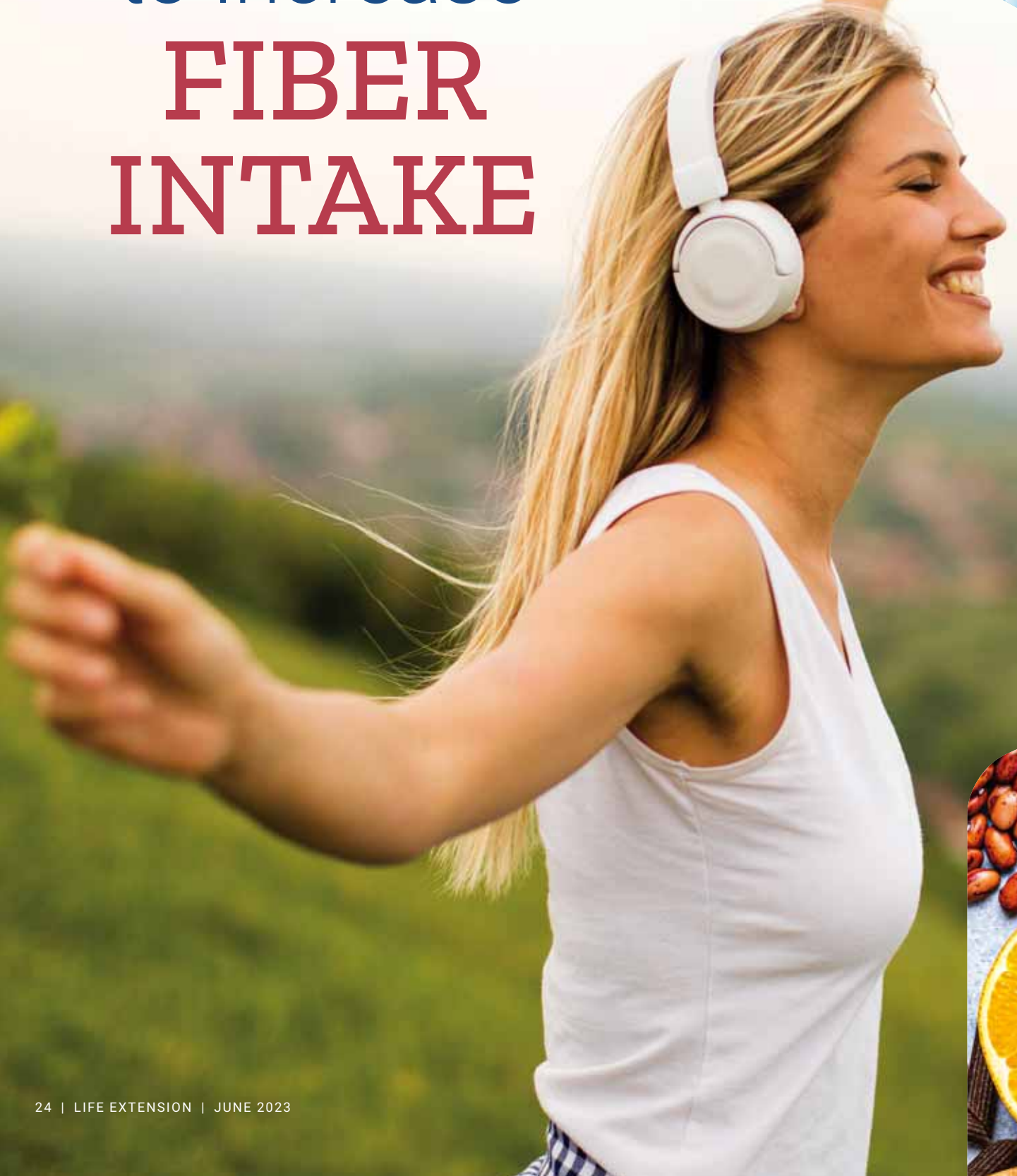
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CAUTION: Individuals consuming more than 50 mcg (2000 IU)/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10000 IU per day unless recommended by your doctor. Vitamin D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



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An *Easy* Way to Increase **FIBER** **INTAKE**





BY MICHAEL DOWNEY

About **90% -97%** of American adults do not ingest the recommended amount of dietary **fiber**.¹

That's a serious health concern.²⁻⁵

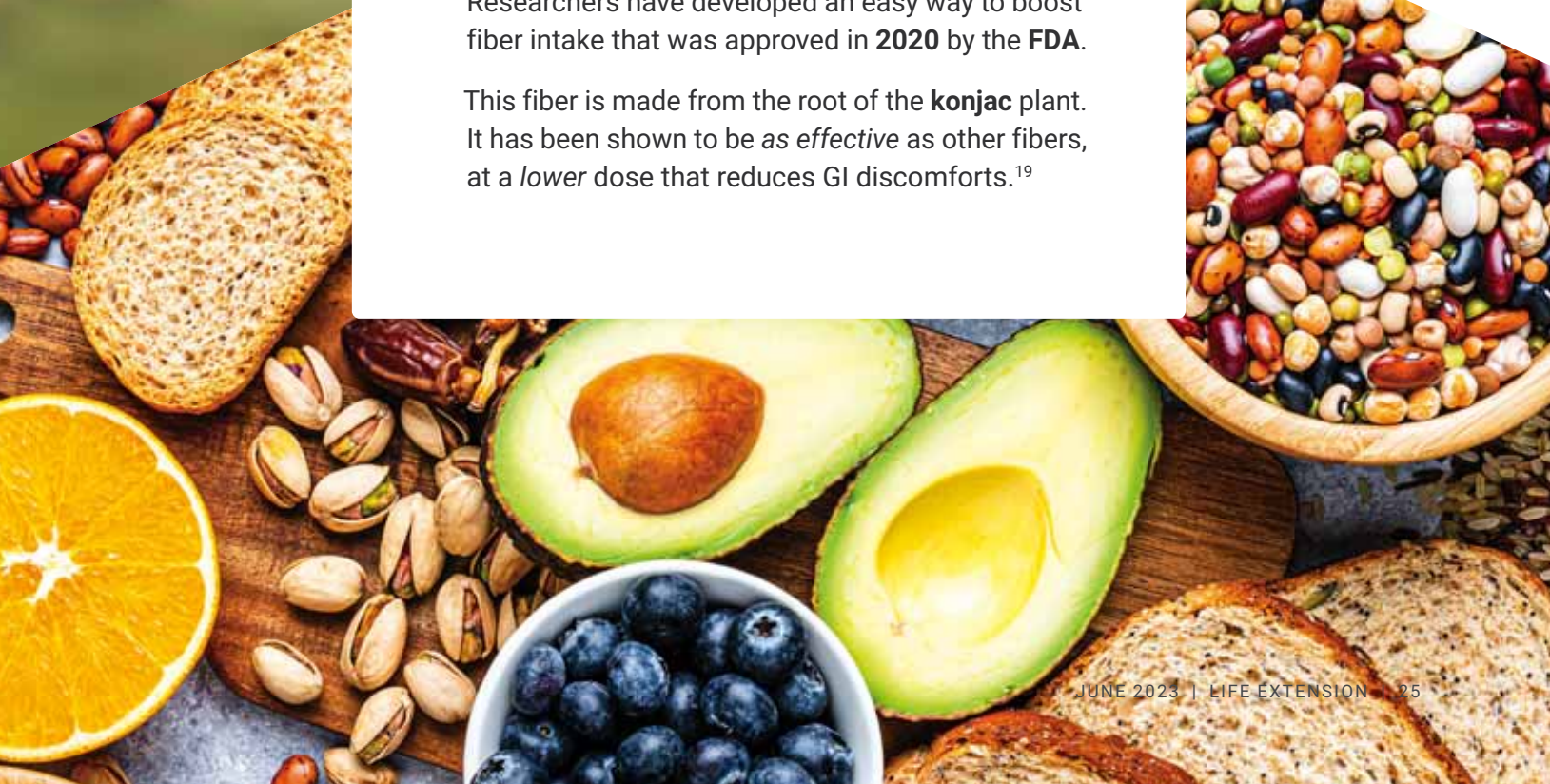
Dietary fiber helps control blood sugar,⁶⁻⁸ cholesterol,^{7,9,10} blood pressure,^{7,9,11,12} and body weight,^{6,7,9,13} while promoting healthy gut bacteria.^{14,15}

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 sugar⁸ 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.

WHAT
YOU
NEED
TO
KNOW

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.



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

1. Available at: <https://www.dietaryguidelines.gov/resources/2020-2025-dietary-guidelines-online-materials>. Accessed March, 13, 2023.
2. Soliman GA. Dietary Fiber, Atherosclerosis, and Cardiovascular Disease. *Nutrients*. 2019 May 23;11(5).
3. Gill SK, Rossi M, Bajka B, et al. Dietary fibre in gastrointestinal health and disease. *Nat Rev Gastroenterol Hepatol*. 2021 Feb;18(2):101-16.
4. Barber TM, Kabisch S, Pfeiffer AFH, et al. The Health Benefits of Dietary Fibre. *Nutrients*. 2020 Oct 21;12(10).
5. Holscher HD. Dietary fiber and prebiotics and the gastrointestinal microbiota. *Gut Microbes*. 2017 Mar 4;8(2):172-84.
6. Ueno H, Haraguchi N, Azuma M, et al. Active Consumption of Konjac and Konjac Products Improves Blood Glucose Control in Patients with Type 2 Diabetes Mellitus. *J Am Nutr Assoc*. 2023 Feb;42(2):123-9.
7. Guo S. Insulin signaling, resistance, and the metabolic syndrome: insights from mouse models into disease mechanisms. *J Endocrinol*. 2014 Feb;220(2):T1-T23.
8. Mao T, Huang F, Zhu X, et al. Effects of dietary fiber on glycemic control and insulin sensitivity in patients with type 2 diabetes: A systematic review and meta-analysis. *Journal of Functional Foods*. 2021 2021/07/01;82:104500.
9. Devaraj RD, Reddy CK, Xu B. Health-promoting effects of konjac glucomannan and its practical applications: A critical review. *Int J Biol Macromol*. 2019 Apr 1;126:273-81.
10. Soliman GA. Dietary Fiber, Atherosclerosis, and Cardiovascular Disease. *Nutrients*. 2019 May 23;11(5):1155.
11. Nepali P, Suresh S, Pikale G, et al. Hypertension and the Role of Dietary Fiber. *Curr Probl Cardiol*. 2022 Jul;47(7):101203.
12. Reynolds AN, Akerman A, Kumar S, et al. Dietary fibre in hypertension and cardiovascular disease management: systematic review and meta-analyses. *BMC Med*. 2022 Apr 22;20(1):139.
13. Sweat W, Manore MM. Dietary Fiber. *ACSM'S Health & Fitness Journal*. 2015;19(1):9-16.
14. Cronin P, Joyce SA, O'Toole PW, et al. Dietary Fibre Modulates the Gut Microbiota. *Nutrients*. 2021 May 13;13(5).
15. Oliver A, Chase AB, Weihe C, et al. High-Fiber, Whole-Food Dietary Intervention Alters the Human Gut Microbiome but Not Fecal Short-Chain Fatty Acids. *mSystems*. 2021 Mar 16;6(2):e00115-21.
16. Lattimer JM, Haub MD. Effects of dietary fiber and its components on metabolic health. *Nutrients*. 2010 Dec;2(12):1266-89.
17. Yang Y, Zhao LG, Wu QJ, et al. Association between dietary fiber and lower risk of all-cause mortality: a meta-analysis of cohort studies. *Am J Epidemiol*. 2015 Jan 15;181(2):83-91.
18. Park Y, Subar AF, Hollenbeck A, et al. Dietary fiber intake and mortality in the NIH-AARP diet and health study. *Arch Intern Med*. 2011 Jun 27;171(12):1061-8.
19. Available at: <https://www.fda.gov/food/cfsan-constituent-updates/fda-grants-citizen-petition-glucomannan-dietary-fiber>. Accessed March, 13, 2023.
20. Chen HL, Cheng HC, Liu YJ, et al. Konjac acts as a natural laxative by increasing stool bulk and improving colonic ecology in healthy adults. *Nutrition*. 2006 Nov-Dec;22(11-12):1112-9.
21. Chen HL, Cheng HC, Wu WT, et al. Supplementation of konjac glucomannan into a low-fiber Chinese diet promoted bowel movement and improved colonic ecology in constipated adults: a placebo-controlled, diet-controlled trial. *J Am Coll Nutr*. 2008 Feb;27(1):102-8.
22. Birketvedt GS, Shimshi M, Erling T, et al. Experiences with three different fiber supplements in weight reduction. *Med Sci Monit*. 2005 Jan;11(1):PI5-8.
23. Yoshida A, Kimura T, Tsunekawa K, et al. Glucomannan Inhibits Rice Gruel-Induced Increases in Plasma Glucose and Insulin Levels. *Ann Nutr Metab*. 2020;76(4):259-67.
24. Ho HVT, Jovanovski E, Zurbau A, et al. A systematic review and meta-analysis of randomized controlled trials of the effect of konjac glucomannan, a viscous soluble fiber, on LDL cholesterol and the new lipid targets non-HDL cholesterol and apolipoprotein B. *Am J Clin Nutr*. 2017 May;105(5):1239-47.
25. Available at: <https://www.health.harvard.edu/blog/should-i-be-eating-more-fiber-2019022115927#:~:text=Fiber%3A%20how%20much%20is%20enough,and%2030%20daily%20grams%2C%20respectively>. Accessed March 14, 2023.
26. Choi KH, Kim ST, Bin BH, et al. Effect of Konjac Glucomannan (KGM) on the Reconstitution of the Dermal Environment against UVB-Induced Condition. *Nutrients*. 2020 Sep 11;12(9).
27. Khan H, Marya. Konjac (Amorphophallus konjac). In: Nabavi SM, Silva AS, editors. *Nonvitamin and Nonmineral Nutritional Supplements*: Academic Press; 2019:307-12.
28. Ariestanti CA, Seechamnanturakit V, Harmayani E, et al. Optimization on production of konjac oligo-glucomannan and their effect on the gut microbiota. *Food Sci Nutr*. 2019 Feb;7(2):788-96.
29. Zhang Y, Zhao Y, Yang W, et al. Structural complexity of Konjac glucomannan and its derivatives governs the diversity and outputs of gut microbiota. *Carbohydrate Polymers*. 2022 2022/09/15;292:119639.



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References:

1. *Nutrition* 22 (2006) 1112–1119.
2. *J Am Coll Nutr.* 2008 Feb;27(1):102-8.
3. *Med Sci Monit.* 2005 Jan;11(1):P15-8.
4. *Ann Nutr Metab* 2020;76:259–267.
5. *Am J Clin Nutr* 2017; 123:9-1247.

† 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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A close-up photograph of a person's midsection. The person is wearing a light-colored, ribbed top and dark pants. Their hands are placed on their waist, and a yellow measuring tape is being used to measure the circumference. The tape shows numbers from 9 to 20. In the top right corner, there is a decorative graphic of two hexagons, one larger than the other, with a soft-focus background of what appears to be a kitchen or dining area.

Activate Your
FAT-BURNING
Enzyme
Turn on more AMPK!



BY MICHAEL DOWNEY

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**.

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 fat**⁵ 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 activator**^{7,23} 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



Get Help Burning Belly Fat

- Activity of the “fat-burning enzyme” **AMPK** can decrease with age, contributing to accumulation of dangerous and inflammatory abdominal fat.
- Researchers developed an extract of *Gynostemma pentaphyllum* that contains **10 times** the usual amount of two AMPK-activating compounds.
- This patented *G. pentaphyllum* extract was shown in a controlled human study to reduce total fat area by **6.3%** and abdominal fat deposits by **11%**.
- The citrus flavonoid **hesperidin** also boosts AMPK and was shown in a human trial to reduce percent of body fat by **3.7%**.
- *G. pentaphyllum* and **hesperidin** can be taken together to help activate AMPK and reduce abdominal fat and its deadly effects.

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

- Wang Q, Sun J, Liu M, et al. The New Role of AMP-Activated Protein Kinase in Regulating Fat Metabolism and Energy Expenditure in Adipose Tissue. *Biomolecules*. 2021 Nov 24;11(12).
- Salminen A, Kaarniranta K. AMP-activated protein kinase (AMPK) controls the aging process via an integrated signaling network. *Ageing Res Rev*. 2012 Apr;11(2):230-41.
- Tamargo-Gomez I, Marino G. AMPK: Regulation of Metabolic Dynamics in the Context of Autophagy. *Int J Mol Sci*. 2018 Nov 29;19(12).
- Salminen A, Ojala J, Kaarniranta K, et al. Mitochondrial dysfunction and oxidative stress activate inflammasomes: impact on the aging process and age-related diseases. *Cell Mol Life Sci*. 2012 Sep;69(18):2999-3013.
- Park SH, Huh TL, Kim SY, et al. Antiobesity effect of Gynostemma pentaphyllum extract (actiponin): a randomized, double-blind, placebo-controlled trial. *Obesity (Silver Spring)*. 2014 Jan;22(1):63-71.
- Rizza S, Muniyappa R, Iantorno M, et al. Citrus polyphenol hesperidin stimulates production of nitric oxide in endothelial cells while improving endothelial function and reducing inflammatory markers in patients with metabolic syndrome. *J Clin Endocrinol Metab*. 2011 May;96(5):E782-92.
- Nguyen PH, Gauhar R, Hwang SL, et al. New dammarane-type glucosides as potential activators of AMP-activated protein kinase (AMPK) from Gynostemma pentaphyllum. *Bioorg Med Chem*. 2011 Nov 1;19(21):6254-60.
- Xiong H, Wang J, Ran Q, et al. Hesperidin: A Therapeutic Agent For Obesity. *Drug Des Devel Ther*. 2019;13:3855-66.
- Bawadi H, Katkhouda R, Tayyem R, et al. Abdominal Fat Is Directly Associated With Inflammation In Persons With Type-2 Diabetes Regardless Of Glycemic Control - A Jordanian Study. *Diabetes Metab Syndr Obes*. 2019;12:2411-7.
- Powell-Wiley TM, Poirier P, Burke LE, et al. Obesity and Cardiovascular Disease: A Scientific Statement From the American Heart Association. *Circulation*. 2021 May 25;143(21):e984-e1010.
- Lee JJ, Pedley A, Hoffmann U, et al. Association of Changes in Abdominal Fat Quantity and Quality With Incident Cardiovascular Disease Risk Factors. *J Am Coll Cardiol*. 2016 Oct 4;68(14):1509-21.
- Freemantle N, Holmes J, Hockey A, et al. How strong is the association between abdominal obesity and the incidence of type 2 diabetes? *Int J Clin Pract*. 2008 Sep;62(9):1391-6.
- Shuster A, Patlas M, Pinthus JH, et al. The clinical importance of visceral adiposity: a critical review of methods for visceral adipose tissue analysis. *Br J Radiol*. 2012 Jan;85(1009):1-10.
- Tchernof A, Despres JP. Pathophysiology of human visceral obesity: an update. *Physiol Rev*. 2013 Jan;93(1):359-404.
- Long YC, Zierath JR. AMP-activated protein kinase signaling in metabolic regulation. *J Clin Invest*. 2006 Jul;116(7):1776-83.
- McCarty MF. AMPK activation--protean potential for boosting healthspan. *Age (Dordr)*. 2014 Apr;36(2):641-63.
- Srivastava RA, Pinkosky SL, Filippov S, et al. AMP-activated protein kinase: an emerging drug target to regulate imbalances in lipid and carbohydrate metabolism to treat cardio-metabolic diseases. *J Lipid Res*. 2012 Dec;53(12):2490-514.
- Salminen A, Hyttinen JM, Kaarniranta K. AMP-activated protein kinase inhibits NF-kappaB signaling and inflammation: impact on healthspan and lifespan. *J Mol Med (Berl)*. 2011 Jul;89(7):667-76.
- Salminen A, Kaarniranta K, Kauppinen A. Age-related changes in AMPK activation: Role for AMPK phosphatases and inhibitory phosphorylation by upstream signaling pathways. *Ageing Res Rev*. 2016 Jul;28:15-26.
- Kola B. Role of AMP-activated protein kinase in the control of appetite. *J Neuroendocrinol*. 2008 Jul;20(7):942-51.
- Nguyen NH, Ha TKQ, Yang JL, et al. Triterpenoids from the genus Gynostemma: Chemistry and pharmacological activities. *J Ethnopharmacol*. 2021 Mar 25;268:113574.
- Wang M, Wang F, Wang Y, et al. Metabonomics study of the therapeutic mechanism of Gynostemma pentaphyllum and atorvastatin for hyperlipidemia in rats. *PLoS One*. 2013;8(11):e78731.
- Gauhar R, Hwang SL, Jeong SS, et al. Heat-processed Gynostemma pentaphyllum extract improves obesity in ob/ob mice by activating AMP-activated protein kinase. *Biotechnol Lett*. 2012 Sep;34(9):1607-16.
- Tan Y, Kamal MA, Wang ZZ, et al. Chinese herbal extracts (SK0506) as a potential candidate for the therapy of the metabolic syndrome. *Clin Sci (Lond)*. 2011 Apr;120(7):297-305.
- Li S, Wang Y, Dun W, et al. Effect of Polysaccharide Extracted From Gynostemma Pentaphyllum on the Body Weight and Gut Microbiota of Mice. *Front Nutr*. 2022;9:916425.
- Kim YH, Jung JI, Jeon YE, et al. Gynostemma pentaphyllum extract and its active component gypenoside L improve the exercise performance of treadmill-trained mice. *Nutr Res Pract*. 2022 Jun;16(3):298-313.
- Available at: <https://patents.google.com/patent/US8357786B2/en>. Accessed March, 7, 2023.
- Pu P. [Protection mechanisms of hesperidin on mouse with insulin resistance]. *Zhongguo Zhong Yao Za Zhi*. 2016 Sep;41(17):3290-5.
- Day EA, Ford RJ, Steinberg GR. AMPK as a Therapeutic Target for Treating Metabolic Diseases. *Trends Endocrinol Metab*. 2017 Aug;28(8):545-60.
- Yun JW. Possible anti-obesity therapeutics from nature--a review. *Phytochemistry*. 2010 Oct;71(14-15):1625-41.
- Huang R, Zhang Y, Shen S, et al. Antioxidant and pancreatic lipase inhibitory effects of flavonoids from different citrus peel extracts: An in vitro study. *Food Chem*. 2020 Oct 1;326:126785.
- Gomez-Zorita S, Lasa A, Abendano N, et al. Phenolic compounds apigenin, hesperidin and kaempferol reduce in vitro lipid accumulation in human adipocytes. *J Transl Med*. 2017 Nov 21;15(1):237.
- Rufino AT, Costa VM, Carvalho F, et al. Flavonoids as antiobesity agents: A review. *Med Res Rev*. 2021 Jan;41(1):556-85.
- Martinez Noguera FJ, Alcaraz PE, Carlos Vivas J, et al. 8 weeks of 2S-Hesperidin supplementation improves muscle mass and reduces fat in amateur competitive cyclists: randomized controlled trial. *Food Funct*. 2021 May 11;12(9):3872-82.

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References

1. *BJU Int.* 2009 Aug;104(3):352-60.
2. *BMC Complement Altern Med.* 2018 Jan 31;18(1):42.

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CELLULAR Senescence: A Driver of BRAIN AGING

BY BRIAN SCOTT

In recent years, scientists have established that the accumulation of dysfunctional **senescent cells** is a factor in the development of degenerative illnesses.^{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**³⁻⁵ and **Parkinson's**.^{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.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.





WHAT
YOU
NEED
TO
KNOW

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**.

Multiple preclinical studies have shown that **senolytics** can effectively remove senescent cells from the **brain**⁷⁻⁹ 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**.⁹ 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.^{18,19} 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. •



References

1. Chaib S, Tchkonja T, Kirkland JL. Cellular senescence and senolytics: the path to the clinic. *Nat Med.* 2022 Aug;28(8):1556-68.
2. Zhang L, Pitcher LE, Yousefzadeh MJ, et al. Cellular senescence: a key therapeutic target in aging and diseases. *J Clin Invest.* 2022 Aug 1;132(15).
3. Guerrero A, De Strooper B, Arancibia-Carcamo IL. Cellular senescence at the crossroads of inflammation and Alzheimer's disease. *Trends Neurosci.* 2021 Sep;44(9):714-27.
4. Martinez-Cue C, Rueda N. Cellular Senescence in Neurodegenerative Diseases. *Front Cell Neurosci.* 2020;14:16.
5. Liu RM. Aging, Cellular Senescence, and Alzheimer's Disease. *Int J Mol Sci.* 2022 Feb 11;23(4).
6. Lee S, Wang EY, Steinberg AB, et al. A guide to senolytic intervention in neurodegenerative disease. *Mech Ageing Dev.* 2021 Dec;200:111585.
7. Bussian TJ, Aziz A, Meyer CF, et al. Clearance of senescent glial cells prevents tau-dependent pathology and cognitive decline. *Nature.* 2018 Oct;562(7728):578-82.
8. Musi N, Valentine JM, Sickora KR, et al. Tau protein aggregation is associated with cellular senescence in the brain. *Ageing Cell.* 2018 Dec;17(6):e12840.
9. Zhang P, Kishimoto Y, Grammatikakis I, et al. Senolytic therapy alleviates Abeta-associated oligodendrocyte progenitor cell senescence and cognitive deficits in an Alzheimer's disease model. *Nat Neurosci.* 2019 May;22(5):719-28.
10. Sikora E, Bielak-Zmijewska A, Dudkowska M, et al. Cellular Senescence in Brain Aging. *Front Aging Neurosci.* 2021;13:646924.
11. De Luca C, Colangelo A, Virtuoso A, et al. Neurons, Glia, Extracellular Matrix and Neurovascular Unit: A Systems Biology Approach to the Complexity of Synaptic Plasticity in Health and Disease. *International Journal of Molecular Sciences.* 2020 02/24;21:1539.
12. Domingues HS, Portugal CC, Socodato R, et al. Oligodendrocyte, Astrocyte, and Microglia Crosstalk in Myelin Development, Damage, and Repair. *Frontiers in Cell and Developmental Biology.* 2016 2016-June-28;4.
13. Available at: <https://qbi.uq.edu.au/brain-basics/brain/brain-physiology/types-glia>. Accessed March, 24, 2023.
14. Bhat R, Crowe EP, Bitto A, et al. Astrocyte senescence as a component of Alzheimer's disease. *PLoS One.* 2012;7(9):e45069.
15. Walton CC, Begelman D, Nguyen W, et al. Senescence as an Amyloid Cascade: The Amyloid Senescence Hypothesis. *Front Cell Neurosci.* 2020;14:129.
16. Han X, Zhang T, Liu H, et al. Astrocyte Senescence and Alzheimer's Disease: A Review. *Front Aging Neurosci.* 2020;12:148.
17. Tchkonja T, Palmer AK, Kirkland JL. New Horizons: Novel Approaches to Enhance Healthspan Through Targeting Cellular Senescence and Related Aging Mechanisms. *J Clin Endocrinol Metab.* 2021 Mar 8;106(3):e1481-e7.
18. Available at: <https://clinicaltrials.gov/ct2/show/NCT04785300>. Accessed October 25, 2022.
19. Available at: <https://clinicaltrials.gov/ct2/show/NCT04685590>. Accessed October 25, 2022.
20. Kirkland JL, Tchkonja T. Senolytic drugs: from discovery to translation. *J Intern Med.* 2020 Nov;288(5):518-36.
21. Kim SR, Jiang K, Ogronnik M, et al. Increased renal cellular senescence in murine high-fat diet: effect of the senolytic drug quercetin. *Transl Res.* 2019 Nov;213:112-23.
22. Han X, Zhang J, Xue X, et al. Theaflavin ameliorates ionizing radiation-induced hematopoietic injury via the NRF2 pathway. *Free Radic Biol Med.* 2017 Dec;113:59-70.
23. Noberini R, Koolpe M, Lamberto I, et al. Inhibition of Eph receptor-ephrin ligand interaction by tea polyphenols. *Pharmacol Res.* 2012 Oct;66(4):363-73.
24. Yousefzadeh MJ, Zhu Y, McGowan SJ, et al. Fisetin is a senotherapeutic that extends health and lifespan. *EBioMedicine.* 2018 Oct;36:18-28.
25. Zhu Y, Doornebal EJ, Pirtskhalava T, et al. New agents that target senescent cells: the flavone, fisetin, and the BCL-X(L) inhibitors, A1331852 and A1155463. *Ageing (Albany NY).* 2017 Mar 8;9(3):955-63.
26. Lim H, Park H, Kim HP. Effects of flavonoids on senescence-associated secretory phenotype formation from bleomycin-induced senescence in BJ fibroblasts. *Biochem Pharmacol.* 2015 Aug 15;96(4):337-48.
27. Perrott KM, Wiley CD, Desprez PY, et al. Apigenin suppresses the senescence-associated secretory phenotype and paracrine effects on breast cancer cells. *Geroscience.* 2017 Apr;39(2):161-73.

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.

- Scientists searching for a senolytic plant compound that works in a similar way as dasatinib settled on **theaflavins**, poly-phenols derived from black tea. They act by blocking ephrin receptors, a mechanism they share with dasatinib.^{22,23}
- **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.

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*J Diet Suppl. 2021;18(4):387-405.

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One daily capsule provides as much **L-ergothioneine** as 2 to 5 cups of white button mushrooms.^{4,5}

References

1. *Cell Death Differ.* 2010 Jul;17(7):1134-40.
2. *J Diet Suppl.* 2020 Dec 7:1-14.
3. *Free Radic Biol Med.* 2009 Apr 15;46(8):1168-76.
4. *FEBS Lett.* 2018 Oct;592(20):3357-66.
5. *Food Chem.* 2017 Oct 15;233:429-33.

Item #02431 • 30 vegetarian capsules

1 bottle **\$19.50**

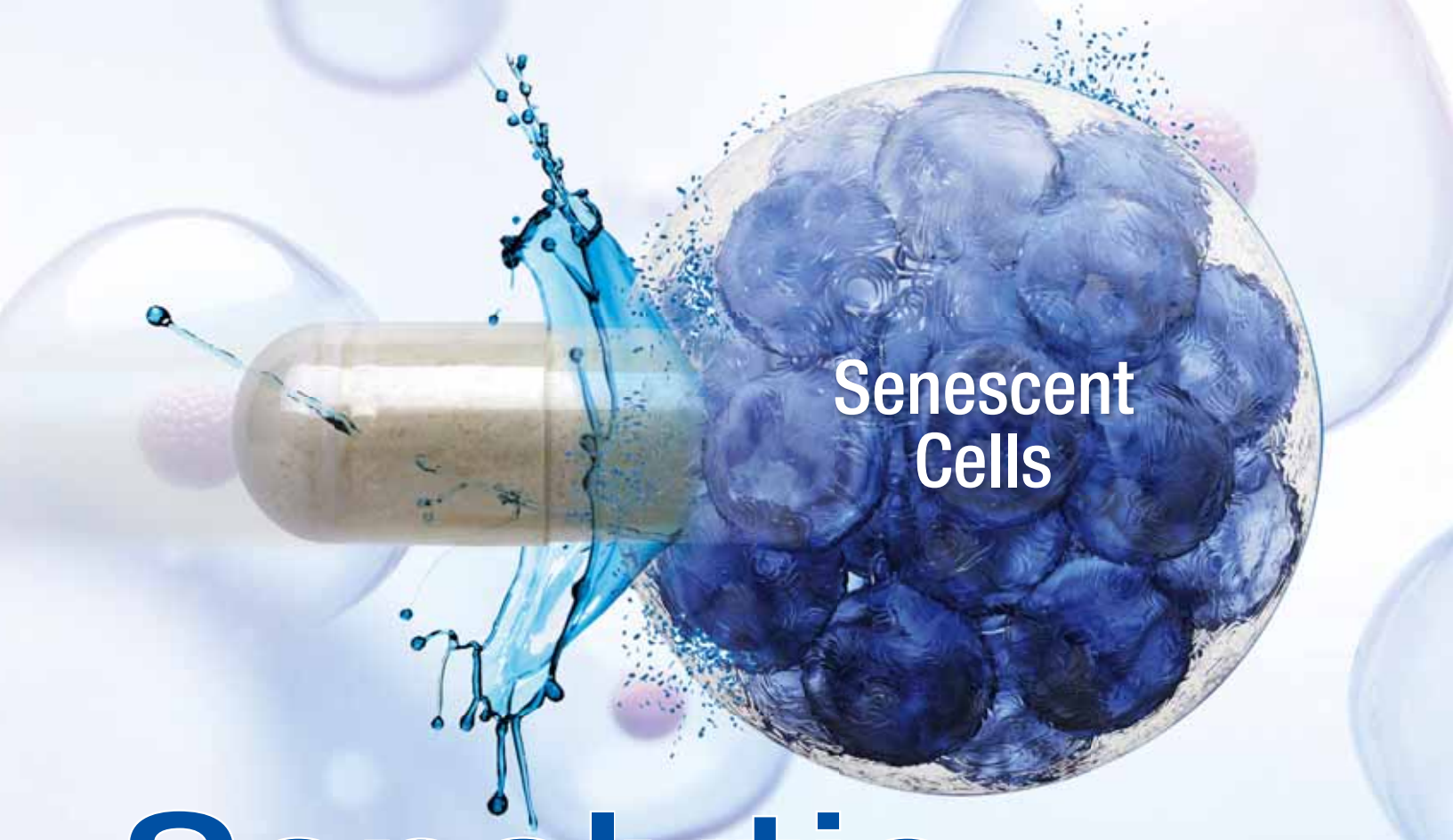
4 bottles \$17.50 each



For full product description and to order **Essential Youth L-Ergothioneine**, call **1-800-544-4440** or visit www.LifeExtension.com

ErgoActive® is a registered mark of Blue California.

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.



Senescent
Cells

Senolytic

ACTIVATOR[®] with **BIO-FISETIN**



“Taking this supplement, I feel I will be healthy for the long haul.”

Larry

VERIFIED
CUSTOMER
REVIEW

Item #02301

36 vegetarian capsules

1 bottle **\$19.50** • 4 bottles \$18 each

(Each bottle lasts 3 months)

For full product description and to order **Senolytic Activator[®]**, call 1-800-544-4440 or visit www.LifeExtension.com

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.)

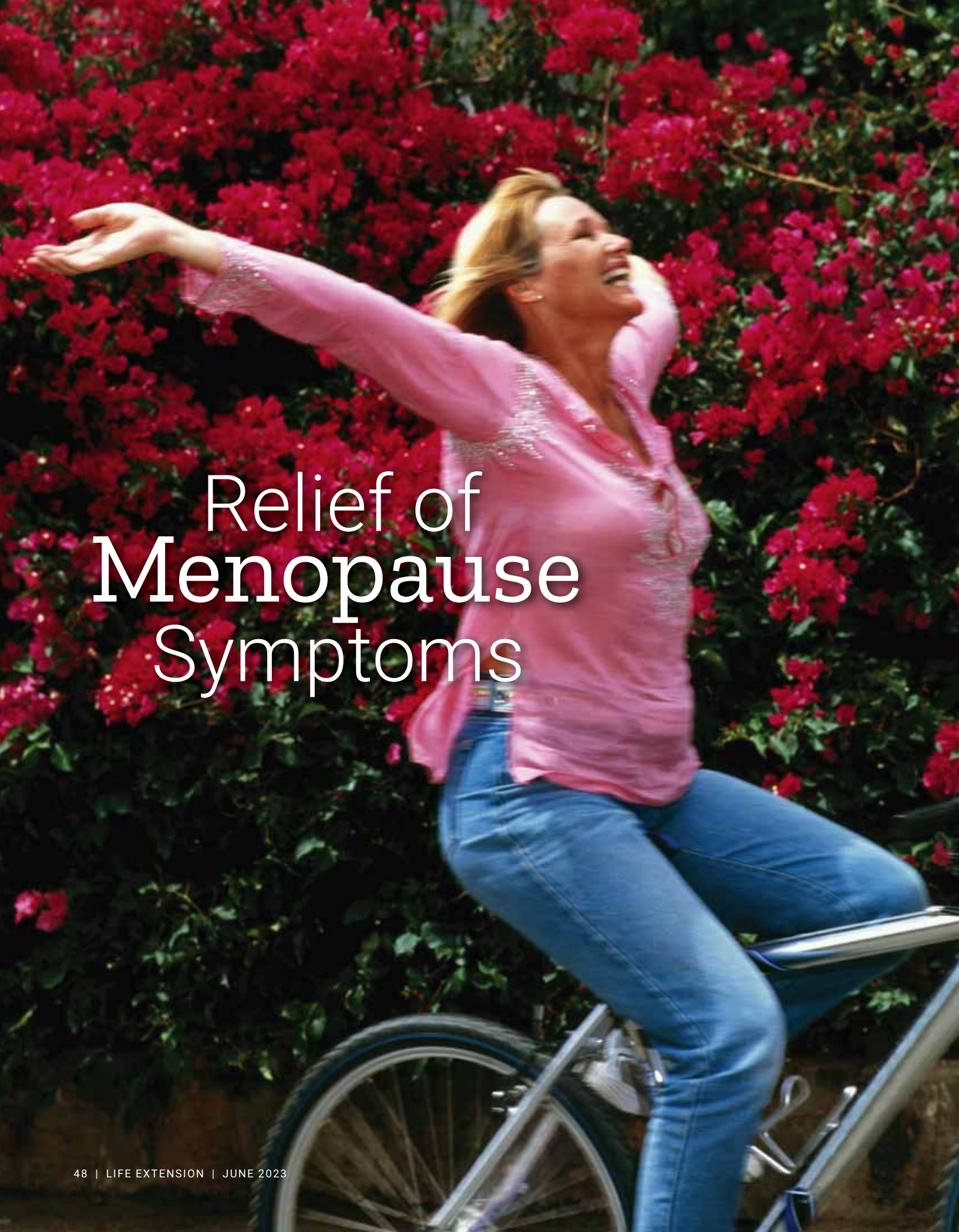
COMPREHENSIVE SENOLYTIC SUPPORT

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.

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.



Relief of Menopause Symptoms



STEVE PAGE, OT/L, PHD, MS, MOT

Hot flashes. Mood swings. Trouble sleeping. Sexual/bladder problems.

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.¹

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.

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



SIBERIAN RHUBARB

WHAT
YOU
NEED
TO
KNOW



Manage Menopause with Siberian Rhubarb

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

Other studies have reported even more robust benefits.

A trial of 112 menopausal women¹⁰ 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.¹

Wide-Ranging Relief

The benefits of **Siberian rhubarb** extend to **all** common symptoms.

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

Mood changes, irritability, depression, and anxiety are also common during perimenopause.^{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.⁵

Research also shows that **physical and mental exhaustion**—two of the most common menopausal symptoms¹⁵—were improved with the extract, in one 48-week observational study, by up to **57%**.¹

Menopause is also associated with **urogenital** symptoms, including painful intercourse, vaginal dryness, and urinary incontinence.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. •

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

- Hasper I, Ventskovskiy BM, Rettenberger R, et al. Long-term efficacy and safety of the special extract ERr 731 of Rheum rhaponticum in perimenopausal women with menopausal symptoms. *Menopause*. 2009 Jan-Feb;16(1):117-31.
- Available at: <https://www.nia.nih.gov/health/what-menopause>. Accessed March, 29, 2023.
- Blumel JE, Arteaga E, Parra J, et al. Decision-making for the treatment of climacteric symptoms using the Menopause Rating Scale. *Maturitas*. 2018 May;111:15-9.
- Chang JL, Montalto MB, Heger PW, et al. Rheum rhaponticum Extract (ERr 731): Postmarketing Data on Safety Surveillance and Consumer Complaints. *Integr Med (Encinitas)*. 2016 Jun;15(3):34-9.
- Kaszkin-Bettag M, Ventskovskiy BM, Kravchenko A, et al. The special extract ERr 731 of the roots of Rheum rhaponticum decreases anxiety and improves health state and general well-being in perimenopausal women. *Menopause*. 2007 Mar-Apr;14(2):270-83.
- Kang S, Jo H, Kim MR. Safety Assessment of Endocrine Disruption by Menopausal Health Functional Ingredients. *Healthcare (Basel)*. 2021 Oct 15;9(10).
- Wober J, Moller F, Richter T, et al. Activation of estrogen receptor-beta by a special extract of Rheum rhaponticum (ERr 731), its aglycones and structurally related compounds. *J Steroid Biochem Mol Biol*. 2007 Nov-Dec;107(3-5):191-201.
- Wilson M, Konda V, Heidt K, et al. Rheum rhaponticum Root Extract Improves Vasomotor Menopausal Symptoms and Estrogen-Regulated Targets in Ovariectomized Rat Model. *Int J Mol Sci*. 2021 Jan 21;22(3).
- Heger M, Ventskovskiy BM, Borzenko I, et al. Efficacy and safety of a special extract of Rheum rhaponticum (ERr 731) in perimenopausal women with climacteric complaints: a 12-week randomized, double-blind, placebo-controlled trial. *Menopause*. 2006 Sep-Oct;13(5):744-59.
- Kaszkin-Bettag M, Ventskovskiy BM, Solskyy S, et al. Confirmation of the efficacy of ERr 731 in perimenopausal women with menopausal symptoms. *Altern Ther Health Med*. 2009 Jan-Feb;15(1):24-34.
- Coborn J, de Wit A, Crawford S, et al. Disruption of Sleep Continuity During the Perimenopause: Associations with Female Reproductive Hormone Profiles. *J Clin Endocrinol Metab*. 2022 Sep 28;107(10):e4144-e53.
- Mirer AG, Young T, Palta M, et al. Sleep-disordered breathing and the menopausal transition among participants in the Sleep in Midlife Women Study. *Menopause*. 2017 Feb;24(2):157-62.
- Li RX, Ma M, Xiao XR, et al. Perimenopausal syndrome and mood disorders in perimenopause: prevalence, severity, relationships, and risk factors. *Medicine (Baltimore)*. 2016 Aug;95(32):e4466.
- Santoro N, Epperson CN, Mathews SB. Menopausal Symptoms and Their Management. *Endocrinol Metab Clin North Am*. 2015 Sep;44(3):497-515.
- Kulkarni P, Savitha Rani BB, Kumar DS, et al. Burgeoning menopausal symptoms: An urgent public health concern. *J Midlife Health*. 2016 Apr-Jun;7(2):83-7.
- Farrell Am E. Genitourinary syndrome of menopause. *Aust Fam Physician*. 2017;46(7):481-4.
- Shah J, Chandanani S, Reddy J, et al. Evaluation of the Efficacy and Safety of Rheum rhaponticum Root Extract (ERr 731) for Menopausal Symptoms in Perimenopausal Indian Women: An Interim Analysis. *J Midlife Health*. 2021 Apr-Jun;12(2):108-15.



"I believe this product is another arrow in my quiver of products I use to be my best."
Raymond
 VERIFIED CUSTOMER REVIEW

Fisetin

The Longevity Flavonoid

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 pathways²⁻⁶
- Extends lifespan of mice by about **10%**⁷
- Removes **senescent** cells through **senolytic** action⁷
- Suppresses excess **mTOR** activation⁸

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

1. Available at: <https://www.mayo.edu/research/clinical-trials/cls-20438802>. Accessed June 22, 2020.
2. *Life Sci.* 2018 Jan 15;193:171-9.
3. *Mini Rev Med Chem.* 2018;18(13):1151-7.
4. *Nutr Res Pract.* 2017 Oct;11(5):430-4.
5. *Biochem Biophys Res Commun.* 2015 Nov 27;467(4):638-44.
6. *Int Immunopharmacol.* 2017 Apr;45:135-47.
7. *EBioMedicine.* 2018 Oct;36:18-28.
8. *J Nutr Biochem.* 2013 Aug;24(8):1547-54.
9. *Manufacturer's study (in press for future publication).* 2020.



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



Promote Oral Health with a Targeted Probiotic Blend

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

1. *Oral Microbiol Immunol.* 2009 Apr;24(2):152-61.
2. *J Med Microbiol.* 2013 Jun;62(Pt 6):875-84.
3. *Benef Microbes.* 2011 Jun;2(2):93-101.
4. IADR/AADR/CADR 89th General Session and Exhibition, 16–19 March 2011, San Diego, CA, USA. Paper no. 150126.



Item #02120 • 30 vegetarian lozenges

1 bottle \$15

4 bottles \$13 each



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

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ESTROGEN
FREE

COMPREHENSIVE menopause *relief*

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



GLUTEN
FREE

1
DAILY

NON
GMO
LE CERTIFIED

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**

ERr 731® is a registered trademark of Chemisch-Pharmazeutische Fabrik Göppingen Carl Müller Apotheker GmbH & Co.

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Theanine

A Sustained Sense of Calm

For full product description and to order Theanine XR™ Stress Relief, call 1-800-544-4440 or visit www.LifeExtension.com



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.

*J Herb Pharmacother. 2006;6(2):21-30.

Item #02429 • 30 vegetarian tablets

1 bottle **\$21** • 4 bottles \$18.50 each

One tablet per day dosing.

AlphaWave® is a registered trademark of Ethical Naturals, Inc.

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Cutting-Edge Lab Tests

BY SCOTT FOGLE, ND



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.



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. •

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.



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

"I like what I see when I
look in my mirror!"

Nancy

VERIFIED CUSTOMER REVIEW

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.



Item #02322 • 120 tablets

1 bottle \$24.75 • 4 bottles \$22.50 each

References

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

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

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.

A female swimmer is captured in a moment of triumph, emerging from the water in a swimming pool. She is wearing a red swim cap, black goggles, and a dark blue swimsuit with white stars. Her right arm is raised in a fist, and she has a joyful expression. The background shows the pool's lane lines and a large window with a grid pattern, suggesting an indoor aquatic facility. The overall mood is energetic and celebratory.

Highlights from the International Society of Sports Nutrition Conference

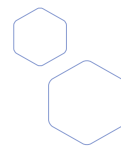


BY CHANCELLOR FALOON

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.



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

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 in skeletal muscles.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



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:⁸

- 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.⁹

Creatine may support cognition, however additional studies are needed.¹⁰

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.



WHAT
YOU
NEED
TO
KNOW

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.¹¹ *Deficits* of nitric oxide have been linked to exercise intolerance.¹² Nitric oxide production is boosted in the body by consuming nitrates, nitrites, or the amino acid **L-arginine**, through diet or direct oral intake.¹¹

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

- Enhanced tolerance of high-intensity exercise¹³ and
- Improved reaction time during intermittent sprint exercises.¹⁴

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.¹⁵ 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.¹⁶

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.





**SCOTT
FORBES**

**MONA
ROSENE**

**ANDREW
JONES**

**GULLERMO
ESCALANTE**

References

- Escalante G, Barakat C. Fasted Versus Nonfasted Aerobic Exercise on Body Composition: Considerations for Physique Athletes. *Strength & Conditioning Journal*. 2020;42(5):71-8.
- Escalante G, Stevenson SW, Barakat C, et al. Peak week recommendations for bodybuilders: an evidence based approach. *BMC Sports Sci Med Rehabil*. 2021 Jun 13;13(1):68.
- Kulikova VA, Gromyko DV, Nikiforov AA. The Regulatory Role of NAD in Human and Animal Cells. *Biochemistry (Mosc)*. 2018 Jul;83(7):800-12.
- Frederick DW, Loro E, Liu L, et al. Loss of NAD Homeostasis Leads to Progressive and Reversible Degeneration of Skeletal Muscle. *Cell Metab*. 2016 Aug 9;24(2):269-82.
- Lamb DA, Moore JH, Mesquita PHC, et al. Resistance training increases muscle NAD(+) and NADH concentrations as well as NAMPT protein levels and global sirtuin activity in middle-aged, overweight, untrained individuals. *Aging (Albany NY)*. 2020 May 5;12(10):9447-60.
- Elhassan YS, Kluckova K, Fletcher RS, et al. Nicotinamide Riboside Augments the Aged Human Skeletal Muscle NAD(+) Metabolome and Induces Transcriptomic and Anti-inflammatory Signatures. *Cell Rep*. 2019 Aug 13;28(7):1717-28 e6.
- Liao B, Zhao Y, Wang D, et al. Nicotinamide mononucleotide supplementation enhances aerobic capacity in amateur runners: a randomized, double-blind study. *J Int Soc Sports Nutr*. 2021 Jul 8;18(1):54.
- Forbes SC, Cordingley DM, Cornish SM, et al. Effects of Creatine Supplementation on Brain Function and Health. *Nutrients*. 2022 Feb 22;14(5):921.
- Pires LA, Forbes SC, Candow DG, et al. Creatine supplementation on cognitive performance following exercise in female Muay Thai athletes. *NeuroSports*. 2021;1(1):6.
- Angerinos KI, Spyrou N, Bougioukas KI, et al. Effects of creatine supplementation on cognitive function of healthy individuals: A systematic review of randomized controlled trials. *Exp Gerontol*. 2018 Jul 15;108:166-73.
- Jones AM, Vanhatalo A, Seals DR, et al. Dietary Nitrate and Nitric Oxide Metabolism: Mouth, Circulation, Skeletal Muscle, and Exercise Performance. *Med Sci Sports Exerc*. 2021 Feb 1;53(2):280-94.
- Dyakova EY, Kapilevich LV, Shylko VG, et al. Physical exercise associated with NO production: signaling pathways and significance in health and disease. *Front Cell Dev Biol*. 2015;3:19.
- Bailey SJ, Winyard P, Vanhatalo A, et al. Dietary nitrate supplementation reduces the O₂ cost of low-intensity exercise and enhances tolerance to high-intensity exercise in humans. *J Appl Physiol (1985)*. 2009 Oct;107(4):1144-55.
- Thompson C, Vanhatalo A, Jell H, et al. Dietary nitrate supplementation improves sprint and high-intensity intermittent running performance. *Nitric Oxide*. 2016 Dec 30;61:55-61.
- Pawlak-Chaouch M, Boissiere J, Gamelin FX, et al. Effect of dietary nitrate supplementation on metabolic rate during rest and exercise in human: A systematic review and a meta-analysis. *Nitric Oxide*. 2016 Feb 29;53:65-76.
- Karwowska M, Kononiuk A. Nitrates/Nitrites in Food-Risk for Nitrosative Stress and Benefits. *Antioxidants (Basel)*. 2020 Mar 16;9(3).

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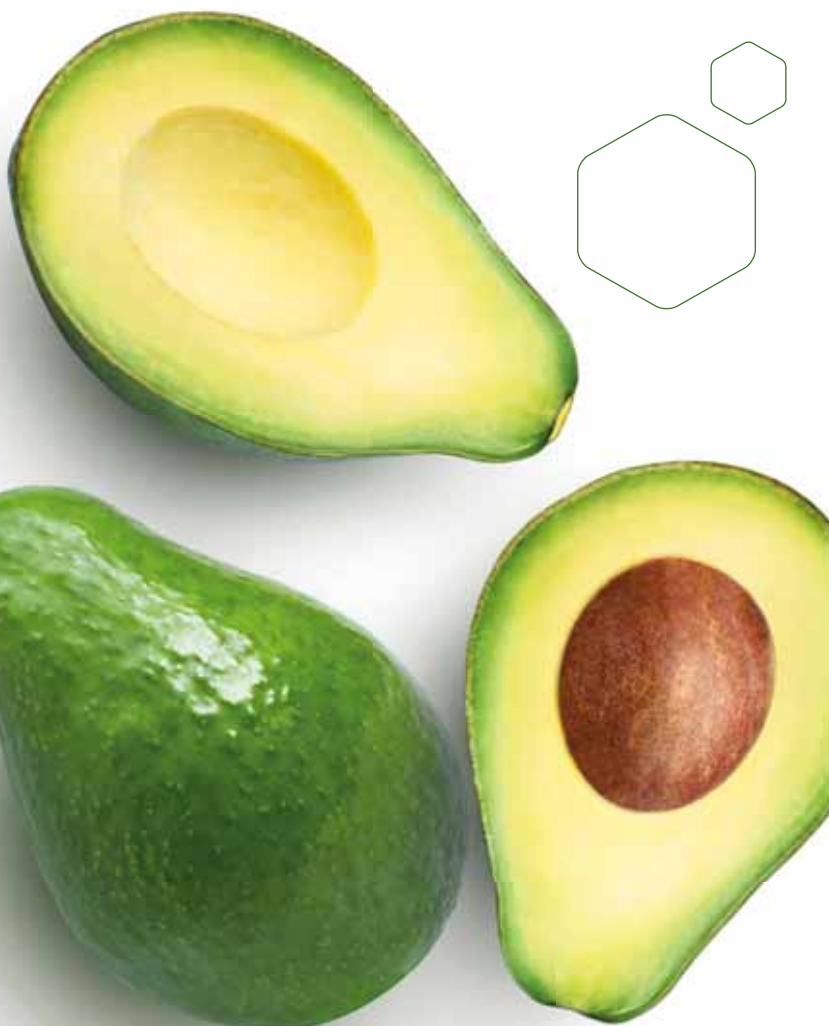
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Avocado

BY LAURIE MATHENA



References

1. Available at: <https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=103810>. Accessed February, 25, 2023.
2. Available at: [https://www.hsph.harvard.edu/nutritionsource/avocados/#:~:text=Source%20Of,-Fat%20\(mostly%20monounsaturated&text=A%20whole%20medium%20avocado%20contains,levels%2C%20avocados%20contain%20no%20cholesterol](https://www.hsph.harvard.edu/nutritionsource/avocados/#:~:text=Source%20Of,-Fat%20(mostly%20monounsaturated&text=A%20whole%20medium%20avocado%20contains,levels%2C%20avocados%20contain%20no%20cholesterol). Accessed February, 25, 2023.
3. Motta JR, Jung I, Azzolin VF, et al. Avocado oil (*Persea americana*) protects SH-SY5Y cells against cytotoxicity triggered by cortisol by the modulation of BDNF, oxidative stress, and apoptosis molecules. *J Food Biochem*. 2021 Feb;45(2):e13596.
4. Mahmassani HA, Avendano EE, Raman G, et al. Avocado consumption and risk factors for heart disease: a systematic review and meta-analysis. *Am J Clin Nutr*. 2018 Apr 1;107(4):523-36.
5. Wang L, Tao L, Hao L, et al. A Moderate-Fat Diet with One Avocado per Day Increases Plasma Antioxidants and Decreases the Oxidation of Small, Dense LDL in Adults with Overweight and Obesity: A Randomized Controlled Trial. *J Nutr*. 2020 Feb 1;150(2):276-84.
6. Khan NA, Edwards CG, Thompson SV, et al. Avocado Consumption, Abdominal Adiposity, and Oral Glucose Tolerance Among Persons with Overweight and Obesity. *J Nutr*. 2021 Sep 4;151(9):2513-21.
7. Heskey C, Oda K, Sabate J. Avocado Intake, and Longitudinal Weight and Body Mass Index Changes in an Adult Cohort. *Nutrients*. 2019 Mar 23;11(3).
8. Zhu L, Huang Y, Edirisinghe I, et al. Using the Avocado to Test the Satiety Effects of a Fat-Fiber Combination in Place of Carbohydrate Energy in a Breakfast Meal in Overweight and Obese Men and Women: A Randomized Clinical Trial. *Nutrients*. 2019 Apr 26;11(5).

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. ●

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Jane

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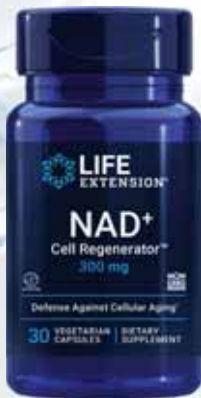
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Protect Against Age-Related Memory Loss

BY LAURIE MATHENA



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, and¹⁴
- 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.⁶

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

- Dare LR, Garcia A, Soares CB, et al. The Reversal of Memory Deficits in an Alzheimer's Disease Model Using Physical and Cognitive Exercise. *Front Behav Neurosci*. 2020;14:152.
- Gustafson C, Dale E, Bredesen, md: Reversing Cognitive Decline. *Integr Med (Encinitas)*. 2015 Oct;14(5):26-9.
- Bredesen DE. Reversal of cognitive decline: a novel therapeutic program. *Aging (Albany NY)*. 2014 Sep;6(9):707-17.
- Forlenza OV, Radanovic M, Talib LL, et al. Clinical and biological effects of long-term lithium treatment in older adults with amnesic mild cognitive impairment: randomised clinical trial. *Br J Psychiatry*. 2019 Nov;215(5):668-74.
- Leszek J, Inglot AD, Janusz M, et al. Colostrinin proline-rich polypeptide complex from ovine colostrum--a long-term study of its efficacy in Alzheimer's disease. *Med Sci Monit*. 2002 Oct;8(10):PI93-6.
- Leszek J, Inglot AD, Janusz M, et al. Colostrinin: a proline-rich polypeptide (PRP) complex isolated from ovine colostrum for treatment of Alzheimer's disease. A double-blind, placebo-controlled study. *Arch Immunol Ther Exp (Warsz)*. 1999;47(6):377-85.
- Nunes MA, Viel TA, Buck HS. Microdose lithium treatment stabilized cognitive impairment in patients with Alzheimer's disease. *Curr Alzheimer Res*. 2013 Jan;10(1):104-7.
- Gladkevich A, Bosker F, Korf J, et al. Proline-rich polypeptides in Alzheimer's disease and neurodegenerative disorders -- therapeutic potential or a mirage? *Prog Neuropsychopharmacol Biol Psychiatry*. 2007 Oct 1;31(7):1347-55.
- Matsunaga S, Kishi T, Annas P, et al. Lithium as a Treatment for Alzheimer's Disease: A Systematic Review and Meta-Analysis. *J Alzheimers Dis*. 2015;48(2):403-10.
- Szanaszlo P, German P, Hajas G, et al. New insights into clinical trial for Colostrinin in Alzheimer's disease. *J Nutr Health Aging*. 2009 Mar;13(3):235-41.
- Available at: <https://www.nia.nih.gov/health/what-happens-brain-alzheimers-disease>. Accessed February, 25, 2023.
- Pan Y, Short JL, Newman SA, et al. Cognitive benefits of lithium chloride in APP/PS1 mice are associated with enhanced brain clearance of beta-amyloid. *Brain Behav Immun*. 2018 May;70:36-47.
- Liu M, Qian T, Zhou W, et al. Beneficial effects of low-dose lithium on cognitive ability and pathological alteration of Alzheimer's disease transgenic mice model. *Neuroreport*. 2020 Sep 9;31(13):943-51.
- Forlenza OV, de Paula VJ, Machado-Vieira R, et al. Does lithium prevent Alzheimer's disease? *Drugs Aging*. 2012 May 1;29(5):335-42.
- Hajek T, Weiner MW. Neuroprotective Effects of Lithium in Human Brain? Food for Thought. *Curr Alzheimer Res*. 2016;13(8):862-72.
- Schuster D, Rajendran A, Hui SW, et al. Protective effect of colostrinin on neuroblastoma cell survival is due to reduced aggregation of beta-amyloid. *Neuropeptides*. 2005 Aug;39(4):419-26.
- Boldogh I, Kruzel ML. Colostrinin: an oxidative stress modulator for prevention and treatment of age-related disorders. *J Alzheimers Dis*. 2008 Apr;13(3):303-21.
- Janusz M, Zablocka A. Colostrinin: a proline-rich polypeptide complex of potential therapeutic interest. *Cell Mol Biol (Noisy-le-grand)*. 2013 Nov 3;59(1):4-11.



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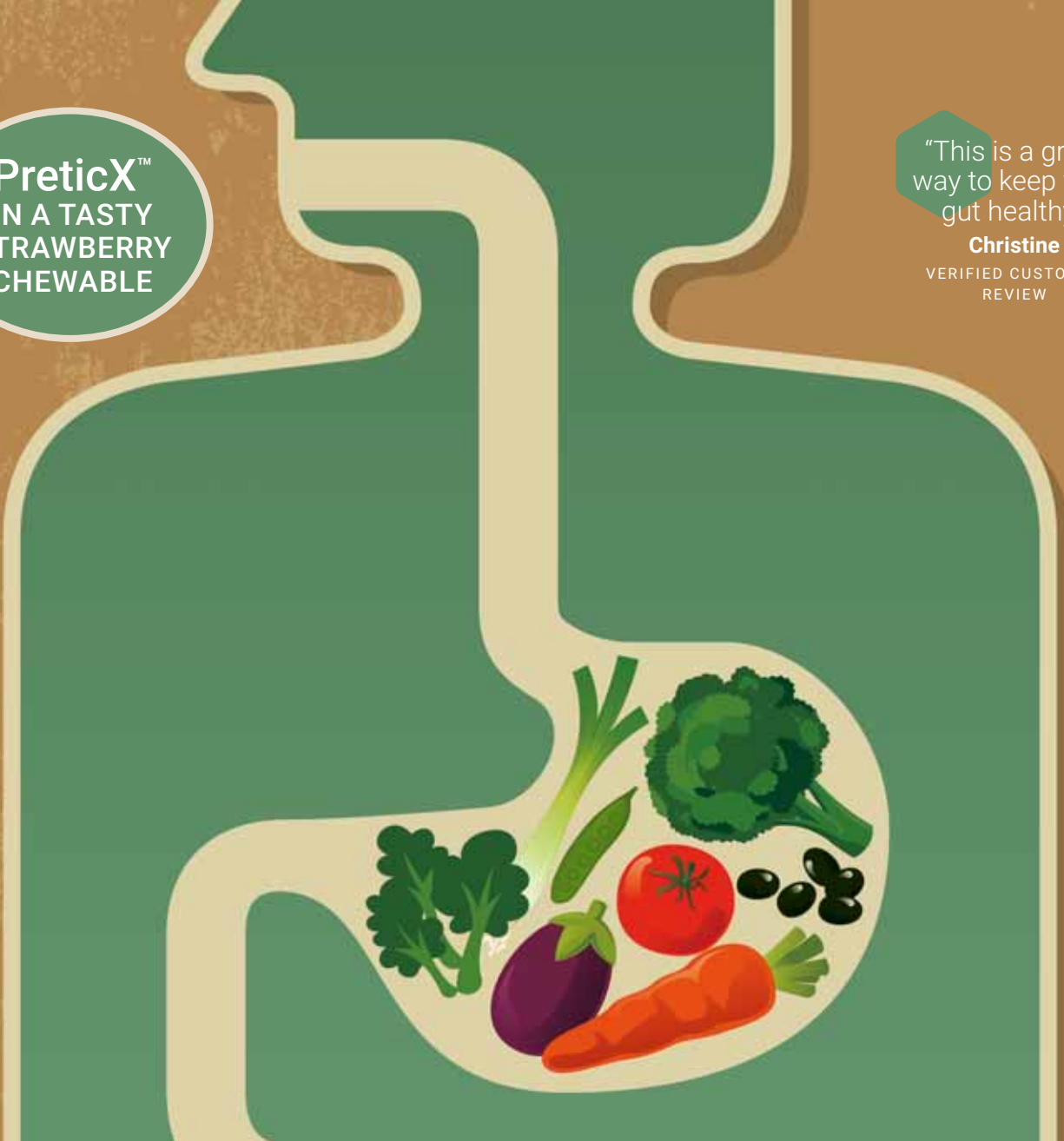
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References

1. *Front Microbiol.* 2016;7:1204.
2. *Korean J Nutr.* 2007;40(2):154-61.

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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



Zen Taupe

NEW!



Chai V Silver

NEW!



NEW!

Spirit V Orchid



NEW!

Spirit V Natural White



Spirit V Silver Metallic



HappyFeet.com/KENKOH
1-800-336-6657

Kenkoh®
The Original Massage Sandal



#1 Rated
Multivitamins | 10 Time Winner†



TWO-PER-DAY
Multivitamin provides:

Vitamin A (beta-carotene, and acetate)	5,000 IU
Vitamin D3 (cholecalciferol)	2,000 IU
Vitamin C (ascorbic acid, calcium and niacinamide ascorbates)	470 mg
Vitamin E (67 mg D-alpha tocopheryl succinate, D-alpha tocopherol)	100 IU
Vitamin E (gamma, delta, alpha, beta tocopherols)	20 mg
Vitamin B1 (thiamine HCl)	75 mg
Vitamin B2 (riboflavin 5'-phosphate)	50 mg
Vitamin B3 (niacinamide, niacinamide ascorbate)	50 mg•
Vitamin B5 (D-calcium pantothenate)	50 mg
Vitamin B6 (pyridoxine HCl, pyridoxal 5'-phosphate)	75 mg
Folate (5-MTHF)	400 mcg
Vitamin B12 (methylcobalamin)	300 mcg
Biotin	300 mcg
Iodine (potassium iodide)	150 mcg
Magnesium (magnesium oxide)	100 mg
Zinc (zinc citrate, L-OptiZinc® zinc mono-L-methionine sulfate)	25 mg
Manganese (manganese citrate, gluconate)	2 mg
Chromium [Crominex® 3+ chromium stabilized with Capros® amla extract (fruit), PrimaVie® Shilajit]	200 mcg
Molybdenum (amino acid chelate)	100 mcg
Inositol	50 mg
Alpha lipoic acid	25 mg
Bio-Quercetin phytosome (providing 5 mg quercetin in an absorption-enhancing phosphatidylcholine complex)	15 mg
Marigold extract [std. to 5 mg trans-lutein, 155 mcg trans-zeaxanthin]	11.12 mg
Apigenin	5 mg
Boron (amino acid chelate)	3 mg
Lycopene [Lycobeads® natural tomato extract (fruit)]	1 mg
Selenium [as sodium selenite, SelenoExcell® high selenium yeast, Se-methyl L-selenocysteine]	200 mcg

For complete list of ingredients and dosages, visit www.LifeExtension.com

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

Item #02315 | 120 tablets

1 bottle **\$18.38**

4 bottles \$16.25 each

Two-Per-Day Multivitamin Capsules

Item #02314 | 120 capsules

1 bottle **\$19.13**

4 bottles \$17 each

Each bottle provides a two-month supply.

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

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.

† Ratings based on results of the 2023 ConsumerLab.com Survey of Supplement Users. More information at www.consumerlab.com/survey.

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.



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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

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