

The Science of a Healthier Life®

LifeExtension.com

May 2020

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NUTRIENT OF THE YEAR: LITHIUM

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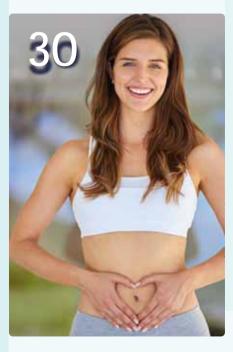
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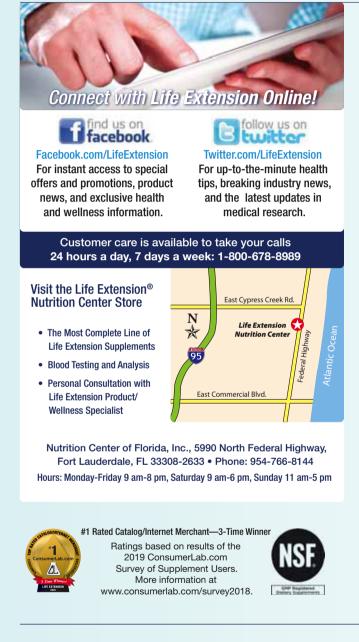
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Resurgence of Diabetes Complications

The <u>increase</u> in healthy longevity that Americans have enjoyed is deteriorating in those with less-than-optimal glucose control.



WILLIAM FALOON

This is regrettable because treatments like **metformin** led to marked improvements for **type II diabetics** starting in **1995**.

Back in the *early* 1990s, diabetics died **7** to **10 years** sooner than non-diabetics and had a:^{1,2}

- **3.7-fold** <u>increased</u> risk for sudden **heart attack**
- 14-fold <u>increased</u> risk for kidney failure
- 18.8-fold <u>increased</u> risk for lower-extremity amputation

Advances initiated in the **1990s** resulted in these risk differences between **diabetics** and <u>non-**diabetics** plummeting up to **68%** by year **2010**.^{1,3} This translates into fewer blood-sugar-related complications.</u>

New challenges have sabotaged these improvements.

A recent review reveals a **resurgence** of some **diabetic complications** in some populations between **2009** and **2015**. This uptick in **diabetic disorders** has begun to <u>reverse</u> decades of hardwon improvements as follows:^{2,4,5}

- 1. Lower-extremity amputations are soaring;
- Emergency room visits caused by hyperglycemic (high blood sugar) crisis have almost <u>doubled;</u>
- Hospitalizations due to hyperglycemic crisis <u>increased</u> by 73%;
- 4. **Deaths** due to hyperglycemic crisis <u>increased</u> by **55%**.

Long-term improvements in Americans aged 18-64 for end-stage **kidney failure**, **heart attack**, and hospitalization for **stroke**, stalled after **2010**.^{2,5}

None of this should surprise readers of *Life Extension*[®] magazine. We long ago predicted an epidemic of **sugar-related** diseases caused by factors that are finally being recognized by the medical establishment.

This editorial describes what's behind the upsurge in **diabetic complications** and how to protect yourself.

Those afflicted with **type II dia-betes** are frequently overweight or obese, and typically do not obtain adequate levels of physical activity.

This results in **insulin resistance**, a hallmark characteristic of type II diabetes.

Insulin resistance occurs when cells in muscle, the liver, and other parts of the body do not respond appropriately to insulin.

As a compensatory mechanism, the body increases the secretion of insulin from the pancreas, resulting in *higher* insulin blood levels.

But resistance to insulin means too much blood sugar remains in circulation. This leads to **damage** inflicted by high **blood glucose** levels, by after-meal glucose spikes, and by high insulin levels.

Microvascular diabetic complications develop as a result of years of poor glycemic control. This means that even <u>before</u> **type II diabetes** is clinically diagnosed, silent damage can result in loss of vision, kidney damage, and painful nerve disease **(neuropathy)**.

There is little mystery behind the spiraling epidemic of diabetic complications.

Sky-High Obesity Prevalence

A staggering **42%** of Americans are obese and nearly **32%** are overweight.^{6,7}

Less than **30%** of Americans are at a healthy weight. The new "normal" for Americans is overweight or obese.

Excess body weight and inadequate physical activity are associated with higher **blood pressure**, elevated **lipids**, and increased levels of **chronic inflammation**.

As the **maps** on page 9 depict, there is direct correlation between excess body mass and type II diabetes prevalence.

There is typically a lag between deteriorating **glycemic control** linked with excess body weight (and inadequate physical activity) and full-blown **type II diabetes**.

Yet during this **prediabetic** period, damage to the eyes, kidneys, and nerves begins.

What makes this regrettable is that poor glucose control, increasing blood lipids, and inflammation can be detected *early* with simple **blood tests**.

Stagnation in Preventive Care

A viewpoint article published in the *Journal of the American Medical Association (JAMA)* identified several factors contributing to surging increases in **diabetesrelated** complications.²

In addition to high **body mass** and failure to control **blood lipids** and **blood pressure**, the **JAMA** authors believe there may be **stagnation** in overall **preventive care**, most prominently in young adults.

This eye-opening **JAMA** view-point states:

"After encouraging reductions in **hemoglobin A1c** levels among patients with diabetes through most of the 2000s, the proportion meeting individualized HbA1c targets declined..."²

This translates into fewer Americans achieving targeted glycemic control blood levels.

High "Normal" Glucose

Hemoglobin A1c is a blood test that measures long-term glucose control. To reduce risk of diabetic complications, <u>optimal</u> glycemic control is critical.

For younger patients with type II diabetes, more stringent glucose control can help reduce diabetesrelated microvascular damage.

In addition, some observational data suggest that blood markers (glucose and hemoglobin A1c) in high "normal" ranges are associated with an increased risk for heart attack⁸⁻¹⁷ and some types of cancer.¹⁸⁻²⁴

Age-Adjusted Prevalence of Obesity and Diagnosed Diabetes Among U.S. Adults

These maps reveal striking *increases* in **obesity** (BMI \geq 30 kg/m²) and **diabetes** that occurred between **1994** and **2015**. This is not mere correlation but reflective of the causative impact of excess body weight on one's ability to maintain optimal (lower reference range) fasting insulin and glucose blood levels.

The material is available on the agency website at no charge.

Reference to specific commercial products, manufacturers, companies, or trademarks does not constitute its endorsement or recommendation by the U.S. Government, Department of Health and Human Services, or Centers for Disease Control and Prevention.

Content source:

Centers for Disease Control and Prevention. https://www.cdc.gov/diabetes/statistics/slides/ maps_diabetesobesity_trends.pdf

For older patients, frail patients, and those with type I diabetes, lower blood sugar targets must be balanced with the risk of hypoglycemia (low blood sugar).

Unpredictable Health Care Coverage

The **JAMA** Viewpoint authors describe how uncertainties related to **health insurance** coverage are causing **diabetic complications** to increase, especially in younger and lower-income groups.²

Even those with **employer-paid** insurance plans face higher **deductibles** that translate into potentially lethal delays in treating and pursuing preventive care in diabetic patients.

The **JAMA** authors express concern about the continually <u>increasing</u> price of **insulin** and other anti-diabetic drugs. These high drug prices lead some people to cut back on treatment.

The authors mentioned that perhaps most concerning are the social and economic factors behind the











increase in **middle-age mortality** that may have preventable causes including the complications of **diabetes**.

What's Behind the Resurgence?

Most of you remember a time when deciding whether to visit a doctor was not a major financial issue.

You may also recall being able to afford the prescribed diagnostic and medication.

As this nation suffocates under greater **regulatory** burdens, the cost of medical care is increasingly being borne by **consumers** who cannot afford it.

The tragic result is that gains made decades ago in protecting against **diabetic complications** have been thrown into <u>reverse</u>.

As more Americans develop diabetic disorders, the burden on today's healthcare system worsens, and costs continue spiraling out of control.

I warned decades ago that this medical fiasco was imminent, in

books, articles, and national media appearances. What I predicted is now recognized by mainstream publications like the *Journal of the American Medical Association*.

What's particularly scary is that **JAMA** is only identifying a resurgence in complications among **diagnosed** diabetics.

It fails to mention that anyone with **less-than-optimal** glucose control is <u>also</u> at higher risk for blood-sugar-related disorders.

Free-Market Solutions

The cornerstone of a diabetes prevention or management program is frequent **blood testing**.

You need to <u>know</u> your **glucose**, **fasting insulin** and **hemoglobin A1c** levels.

With appointment delays, crowded waiting rooms, and high costs, it is challenging even for financially well-off individuals to get real-time updates on their underlying state of glucose control. We at **Life Extension**[®] resolved part of the problem 24 years ago by offering comprehensive **blood tests** direct to consumers at **low cost** with convenient walk-in blood-draw stations in most regions.

If a blood test reveals **higherthan-optimal** ranges for a diabetic or metabolic marker (like **C-reactive protein** or dangerous **lipids**), retests for these specific markers can be done at **affordable** prices soon after **corrective interventions** (such as diet, nutrient, drug, behavior, and lifestyle modifications) are initiated.

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William Faloon, Co-Founder Life Extension Buyers Club



References

- Gregg EW, Li Y, Wang J, et al. Changes in diabetes-related complications in the United States, 1990-2010. N Engl J Med. 2014 Apr 17;370(16):1514-23.
- Gregg EW, Hora I, Benoit SR. Resurgence in Diabetes-Related Complications. *JAMA*. 2019 May 21;321(19):1867-8.
- Ali MK, Bullard KM, Saaddine JB, et al. Achievement of goals in U.S. diabetes care, 1999-2010. N Engl J Med. 2013 Apr 25;368(17):1613-24.
- Geiss LS, Li Y, Hora I, et al. Resurgence of Diabetes-Related Nontraumatic Lower-Extremity Amputation in the Young and Middle-Aged Adult U.S. Population. Diabetes Care. 2019 Jan:42(1):50-4.
- US National, State, and County Diabetes Data. 2020. https://www.cdc.gov/diabetes/ data/index.html.
- Available at: https://www.cdc.gov/nchs/ fastats/obesity-overweight.htm. Accessed February 12, 2020.
- Available at: https://www.cdc.gov/nchs/ data/databriefs/db360-h.pdf. Accessed March 2, 2020.
- Coutinho M, Gerstein HC, Wang Y, et al. The relationship between glucose and incident cardiovascular events. A metaregression analysis of published data from 20 studies of 95,783 individuals followed for 12.4 years. *Diabetes Care.* 1999 Feb;22(2):233-40.
- Bjornholt JV, Erikssen G, Aaser E, et al. Fasting blood glucose: an underestimated risk factor for cardiovascular death. Results from a 22-year follow-up of healthy nondiabetic men. *Diabetes Care.* 1999 Jan;22(1):45-9.
- Kurihara O, Takano M, Yamamoto M, et al. Impact of prediabetic status on coronary atherosclerosis: a multivessel angioscopic study. *Diabetes Care*. 2013 Mar;36(3):729-33.
- 11. Selvin E, Coresh J, Golden SH, et al. Glycemic control and coronary heart disease risk in persons with and without diabetes: the atherosclerosis risk in communities study. *Arch Intern Med.* 2005 Sep 12;165(16):1910-6.
- Lamblin N, Cuvelier E, Gonin X, et al. Abstract 2372: Hemoglobin A1c Levels are Associated with Severity and Prognosis of Systolic Chronic Heart Failure in Non Diabetic Patients. *Circulation.* 2006;114(Suppl 18):II_486-II_7.

- Lin HJ, Lee BC, Ho YL, et al. Postprandial glucose improves the risk prediction of cardiovascular death beyond the metabolic syndrome in the nondiabetic population. *Diabetes Care.* 2009 Sep;32(9):1721-6.
- Levitan EB, Song Y, Ford ES, et al. Is Nondiabetic Hyperglycemia a Risk Factor for Cardiovascular Disease? Archives of Internal Medicine. 2004 Oct 25;164(19): 2147-55.
- Kramer D, Raji A, Plutzky J. Prediabetes mellitus and its links to atherosclerosis. *Curr Diab Rep.* 2003 Feb;3(1):11-8.
- 16. Li Q, Chen AH, Song XD, et al. [Analysis of glucose levels and the risk for coronary heart disease in elderly patients in Guangzhou Haizhu district]. Nan Fang Yi Ke Da Xue Xue Bao. 2010 Jun;30(6):1275-8.
- Onat A, Can G, Cicek G, et al. Fasting, non-fasting glucose and HDL dysfunction in risk of pre-diabetes, diabetes, and coronary disease in non-diabetic adults. *Acta Diabetol.* 2013 Aug;50(4):519-28.
- Salinas-Martinez AM, Flores-Cortes LI, Cardona-Chavarria JM, et al. Prediabetes, diabetes, and risk of breast cancer: a case-control study. Arch Med Res. 2014 Jul;45(5):432-8.
- Stattin P, Bjor O, Ferrari P, et al. Prospective study of hyperglycemia and cancer risk. *Diabetes Care.* 2007 Mar;30(3):561-7.
- Muti P, Quattrin T, Grant BJ, et al. Fasting glucose is a risk factor for breast cancer: a prospective study. *Cancer Epidemiol Biomarkers Prev.* 2002 Nov;11(11):1361-8.
- 21. Schoen RE, Tangen CM, Kuller LH, et al. Increased blood glucose and insulin, body size, and incident colorectal cancer. *J Natl Cancer Inst.* 1999 Jul 7;91(13):1147-54.
- 22. Cust AE, Kaaks R, Friedenreich C, et al. Metabolic syndrome, plasma lipid, lipoprotein and glucose levels, and endometrial cancer risk in the European Prospective Investigation into Cancer and Nutrition (EPIC). *Endocr Relat Cancer.* 2007 Sep;14(3):755-67.
- 23. Yamagata H, Kiyohara Y, Nakamura S, et al. Impact of fasting plasma glucose levels on gastric cancer incidence in a general Japanese population: the Hisayama study. *Diabetes Care.* 2005 Apr;28(4):789-94.
- 24. Onitilo AA, Stankowski RV, Berg RL, et al. Breast cancer incidence before and after diagnosis of type 2 diabetes mellitus in women: increased risk in the prediabetes phase. *Eur J Cancer Prev.* 2014 Mar;23(2):76-83.

Comprehensive Blood Tests at Low Lab Sale Prices

The **Male** and **Female Panels** provide <u>more</u> individual tests compared to their launch over **20 years** ago. Yet the price is far below what commercial labs charge.

Last year we added **fasting insulin** to help detect **glucose control** issues <u>before</u> outward disease manifests. Excess **fasting insulin** can temporarily suppress **blood glucose** and obscure a smoldering problem that can silently damage tissues.

In 2018, we added **apolipoprotein B** to better assess the artery-clogging risk of circulating blood lipids like LDL. This year we've added a **magnesium** serum test to help optimize dosing of this vital mineral.

Commercial labs charge over \$2,000 for the tests included in the Male and Female Panels.

MALE PANEL

METABOLIC PROFILE

Glucose Insulin Hemoglobin A1c Serum Magnesium Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio

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

CARDIAC MARKERS

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

LIPID PROFILE

Total CholesterolLDL (low-density lipoprotein)HDL (high-density lipoprotein)Triglycerides

COMPLETE BLOOD COUNT (CBC)

Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils Platelet count

CANCER MARKER PSA (Prostate Specific Antigen)

HORMONES

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

FEMALE PANEL

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

CARDIAC MARKERS

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

LIPID PROFILE

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

COMPLETE BLOOD COUNT (CBC)

Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils Platelet count

HORMONES

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

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Lab tests are available in the continental United States and Anchorage, AK, only. Not available in Maryland. Restrictions apply in MA, NY, NJ, and RI. Kits not available in PA.

Maintain Endothelial Plaque Stability with

ARTERIAL PROTECT



Arterial Protect can help stabilize endothelial plaque and promote healthy blood flow throughout the body.*

Just <u>one</u> capsule a day provides the patented French Maritime **pine bark extract** used in clinical studies along with **Gotu Kola**.

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

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In the News



Ashwagandha Improves Sleep Quality

A double-blind, randomized, placebo-controlled study found that individuals with insomnia who received an extract of the herb ashwagandha had better sleep and less anxiety (which can affect sleep) in comparison with a placebo group, reported the journal *Cureus*.*

Participants included 60 people with insomnia who received either **300 mg** of ashwagandha root extract or a placebo twice daily for 10 weeks. Sleep actigraphy devices worn during the trial monitored periods of rest and activity, and provided data concerning sleep onset latency, total sleep time, waking after sleep onset and sleep efficiency. Subjects were evaluated for other aspects of sleep as well as anxiety, at the beginning of the study and at five and 10 weeks.

At the end of the study, sleep onset latency was less among participants who received ashwagandha in comparison with the placebo group. Sleep efficiency, sleep quality and other aspects of sleep also improved more in the ashwagandha group.

Editor's Note: "Available conventional therapies of insomnia are known to develop drug dependency and exert side effects. Ashwagandha extract, a natural compound with sleep-inducing potential, is well tolerated and improves sleep quality and sleep onset latency in patients with insomnia," the authors concluded.

* Cureus. 2019 Sep; 11(9): e5797.



Breast Cancer Risk Reduced in Women Over 50 who Lose Weight and Keep it Off

A study published in *JNCI: Journal of the National Cancer Institute*, found that overweight and obese women over the age of 50, who had a sustained weight loss, had a lower risk of breast cancer, compared to those whose weight remained stable.* It has been known for some time that excess body weight raises the risk of breast cancer.

The large study included over 180,000 subjects from the Pooling Project of Prospective Studies of Diet and Cancer, whose weight was assessed three times in about 10 years. Researchers from the American Cancer Society, the Harvard T.H. Chan School of Public Health, and others, found that women who lost about 4.4 lbs. to 10 lbs. had a **13%** lower risk, women who lost 10 lbs. to 20 lbs. had a **16%** lower risk, and those who lost 20 lbs. or more had a **26%** lower risk.

Additionally, women who lost weight, and then gained some of it back, also had a reduced risk of breast cancer compared to women whose weight remained stable. "Our results suggest that even a modest amount of sustained weight loss is associated with lower breast cancer risk for women over 50," said the lead author of the study, Dr. Lauren Teras.

Editor's Note: "These findings may be a strong motivator for the twothirds of American women who are overweight to lose some of that weight," Dr. Teras said.

* J Natl Cancer Inst. 2019 Dec 13.



Three-Day Treatment Decreases Senolytic Cells in Humans

EBioMedicine published a preliminary report from an ongoing clinical trial involving individuals with diabetic kidney disease who experienced a decrease in senescent cell burden following brief treatment with quercetin and the drug dasatinib.*

Senescent cells are aged, damaged cells that, rather than selfdestructing, survive to increase inflammation and death in nonsenescent cells.

While dasatinib plus quercetin have been the subject of experimental research that demonstrated their anti-senolytic effect, little clinical research has been conducted.

In young mice and in humans, increased senescent cell abundance has been found in fat tissue in obesity-related conditions such as metabolic dysfunction and chronic kidney disease. For the current trial, nine participants with diabetic kidney disease received **100 mg** of dasatinib and **1,000 mg** of quercetin daily for three days. Eleven days later, participants exhibited a reduction in senescent cell markers and adipose tissue macrophages (white blood cells that are attracted to and activated by senescent cells) in fat tissue.

Editor's Note: Skin markers of senescent cells and circulating senescent-associated secretory phenotype factors were also reduced, the authors reported.

* EBioMedicine. 2019 Sep.47:446-456.



Zinc Can Help Fight Bacterial Infections, Animal Study Shows

Research reported in *PLoS Pathogens* explored zinc's ability to fight bacterial infections.*

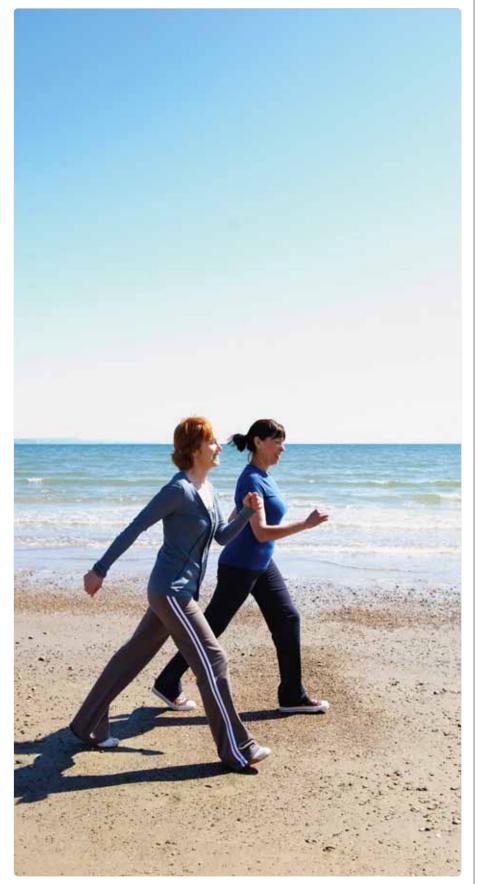
A group of mice were provided with diets that resulted in a **70%** lower level of serum zinc than that of another group given standard lab chow. The animals were then exposed to *Streptococcus pneumoniae*, that causes pneumonia.

Thirty-six hours after exposure, animals that received zinc-restricted diets had a greater bacterial burden in various areas of the body than those given adequate zinc. Elemental bioimaging of the lungs showed lower zinc concentrations in and migration of zinc to specific regions of the lungs of both groups upon infection. "These data show that zinc co-localizes with the invading pathogen in murine [rodent] lungs," the authors stated.

It was determined that phagocytes, immune cells that ingest harmful foreign particles (including bacteria), accumulate zinc and utilize the mineral as a direct antimicrobial agent.

Editor's Note: "This study reveals the link between dietary zinc intake and host resistance to bacterial pneumonia, demonstrating the antimicrobial activity of zinc in host niches against invading S. pneumoniae and in potentiating the efficacy of phagocytic cell killing of the pathogen," the researchers concluded.

* PLoS Pathog. 2019 Aug 22;15(8):e1007957.



Metformin May Help Reduce Ovarian Cancer Risk

An article in *Clinical Cancer Research* describes an experiment designed to validate a hypothesis concerning the genesis of ovarian cancer.*

Acting on initial findings of ageassociated ovarian fibrosis in mice, the researchers determined that fibrosis also occurred in the ovaries of postmenopausal women. In the course of their research, an ovary from a 69-year-old woman was found to have no fibrosis. The woman had been using the drug metformin.

The researchers hypothesized that ovarian fibrosis is caused by damage resulting from inflammation associated with ovulation. Giving mice a drug that prevents ovulation resulted in failure of the animals' ovaries to become fibrotic during aging.

Subsequent examination of 27 ovaries removed from young and old women revealed no fibrosis among five that had been removed from postmenopausal women who used metformin. The findings suggest that metformin could help prevent ovarian cancer among those at risk.

Editor's Note: "These data support a novel hypothesis that unifies the primary non-hereditary ovarian risk factors through the development of ovarian fibrosis and the formation of a premetastatic niche and suggests a potential use for metformin in ovarian cancer prophylaxis," the authors concluded.

* Clin Cancer Res. 2020 Feb 1;26(3):632-642.

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Curcumin Elite[™] contributes to *higher* **blood levels** of bio-active curcuminoids that **stay in the body longer** to provide more health benefits.

Advanced Curcumin Elite[™] contains the same optimal 500 mg potency of curcumin with the <u>added</u> benefits of ginger and additional turmeric actives.

45 times Greater Bioavailability At a <u>Lower</u> Price

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Item #02407 500 mg, 60 vegetarian capsules

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CAUTION: Those who supplement with NAC should drink 6 to 8 glasses of water daily in order to prevent cysteine renal stones. Cysteine renal stones are rare but do occur.

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Boosts Cellular Glutathione Levels

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COMBAT Senescent Cells and AGING

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Senescent cells are old cells that no longer function optimally. Senescent cells emit factors that *accelerate* aging.

Senolytic compounds selectively help target senescent cells in the body.

Laboratory studies show evidence of **systemic rejuvenation** when the **senescent cell** burden is <u>reduced</u>.

Once-Weekly Senolytic Formula

Senolytic Activator provides a highly absorbable form of quercetin phytosome and black tea theaflavins designed to enhance the body's ability to manage senescent cells.

The suggested dose is to take two capsules of **Senolytic Activator** just *once weekly*.

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Senolytic Activator

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24 CAPSULES

DIETARY SUPPLEMENT

Item #02301 • 24 vegetarian capsules 1 box **\$18**

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REVITALIZE COMPONENTS OF YOUR AGING BRAIN!

OPTIMIZED Ashwagandha EXTRACT

Ashwagandha supports the regeneration of axons and dendrites, nerve cell components that support brain and nervous system function.

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Dietary Supplement *of* Year 2020

3

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Melting point (°C): 180.54 Boiling point (°C): 1347

Lithium

BY WILLIAM FALOON

Most years do not uncover a **nutrient** with so much longevity potential that it deserves a special award.

My enthusiasm about a nutrient that deserves a trophy extends beyond the scientific data. I also consider the consumer **affordability** factor.

Melatonin was my previous favorite. We introduced melatonin in **1992** and had a monopoly for a while. Yet we charged only **\$8** for a two-month supply.

This garnered us nationwide media coverage after the **New York Academy of Sciences** validated **melatonin's** ability to improve **immunity** and its **affordability** was recognized.

Accumulated data have uncovered a **nutrient** that costs <u>less</u> than melatonin and may provide **greater** overall benefits.

Prevent Cognitive Decline and Extend Longevity

In the **July 2020** issue of *Life Extension*[®] magazine, you'll read how **modest-dose lithium** may protect against **age-related** disorders and extend **healthy lifespan**.

This information is too important to delay. I therefore summarize here what **lithium** has been shown to do: $^{1-13}$

- 1. **Humans** in areas with *higher* **lithium** in drinking water **live longer**;
- 2. Long term, lithium may help maintain *longer* **telomeres**;
- 3. Lithium has been shown to regulate genes related to healthy DNA structure;
- 4. Lithium appears to slow the rate of brain aging;

- 5. People with *higher* **lithium** intake show **improved mood**;
- **GSK-3** is an *enzyme* that plays a powerful role in regulating metabolism. *Dysfunctional* **GSK-3** activity raises the risk of many chronic diseases of older age including Alzheimer's, type II diabetes, mood disorders, cancer, and others. Lithium has been shown to inhibit overactivity of **GSK-3**;
- 7. By itself, **lithium** extended fruit fly lifespan by an average of **11%;** and
- Combined with two other compounds, lithium extended fruit fly lifespan by an average of 48%.



Rapamycin¹ + Senolytic² + Lithium³

= Fruit Fly Lifespan Extension by 48%

- 1. Rapamycin benefits can partially occur when AMPK is activated.
- 2. Health-conscious people today are utilizing senolytics.
- 3. Scientists are seeking optimal dose for human lifespan extension.

A triple drug combination targeting components of the nutrient-sensing network maximizes longevity.¹⁰



Combination Treatments are Essential

When fruit flies received lithium, rapamycin, senolytic separately and/or in combination:



- Each compound individually extended lifespan by 11%.
- Pairing two extended lifespan roughly 30%.
- Three combined extended lifespan by 48%.¹⁰

What I Discovered During Live Presentations

In my live presentations, I urge audiences to initiate supplementation with about **1,000 mcg** of **lithium** a day. The response from those in the audience who try, on the spot, to order it using their cell phones is that <u>no</u> one offers this lithium **dose**.

This motivated me to investigate. I was pleased to find that lithium's **low-cost** make it consumer friendly analogous to **melatonin** in **1992**.

Its game-changing longevity potential, along with it's affordability causes me to nominate **LITHIUM** as the **2020 nutrient** of the year.

Those seeking the benefits discovered about **lithium** may want to add about **1,000 mcg** each day to their supplement program.

The three slides in this article are from Power Point presentations I give to live audiences, suggesting that they supplement with **lithium**, which up until now, no one seemed to offer in what may be an ideal potency.

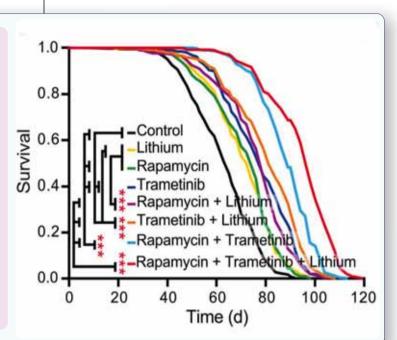
If you have any questions on the scientific content of this article, please call a **Life Extension**[®] Wellness Specialist at 1-866-864-3027.

PNAS-September 30, 2019

"Previous studies in fruit flies have achieved lifespan extensions of about 5-20%

...so we found it was quite remarkable that this drug combination enabled them to live 48% longer."

<u>Combined</u> Interventions Are More Effective than *Single Agent Therapy*¹⁰



References

- Fajardo VA, LeBlanc PJ, Fajardo VA. Trace lithium in Texas tap water is negatively associated with all-cause mortality and premature death. *Appl Physiol Nutr Metab.* 2018 Apr;43(4):412-4.
- Zarse K, Terao T, Tian J, et al. Low-dose lithium uptake promotes longevity in humans and metazoans. *Eur J Nutr.* 2011 Aug;50(5):387-9.
- Squassina A, Pisanu C, Congiu D, et al. Leukocyte telomere length positively correlates with duration of lithium treatment in bipolar disorder patients. *Eur Neuropsychopharmacol.* 2016 Jul;26(7):1241-7.
- McColl G, Killilea DW, Hubbard AE, et al. Pharmacogenetic analysis of lithium-induced delayed aging in Caenorhabditis elegans. J Biol Chem. 2008 Jan 4;283(1):350-7.
- 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.
- Kessing LV, Gerds TA, Knudsen NN, et al. Association of Lithium in Drinking Water With the Incidence of Dementia. *JAMA Psychiatry.* 2017 Oct 1;74(10):1005-10.
- Ishii N, Terao T, Araki Y, et al. Low risk of male suicide and lithium in drinking water. *J Clin Psychiatry*. 2015 Mar;76(3):319-26.
- Castillo-Quan JI, Li L, Kinghorn KJ, et al. Lithium Promotes Longevity through GSK3/NRF2-Dependent Hormesis. *Cell Rep.* 2016 Apr 19;15(3):638-50.
- Saraswati AP, Ali Hussaini SM, Krishna NH, et al. Glycogen synthase kinase-3 and its inhibitors: Potential target for various therapeutic conditions. *Eur J Med Chem.* 2018 Jan 20;144:843-58.
- Castillo-Quan JI, Tain LS, Kinghorn KJ, et al. A triple drug combination targeting components of the nutrient-sensing network maximizes longevity. *Proc Natl Acad Sci U S A.* 2019 Oct 15;116(42):20817-9.
- 11. Liu X, Yao Z. Chronic over-nutrition and dysregulation of GSK3 in diseases. *Nutr Metab (Lond).* 2016 2016/08/04;13(1):49.



- Freland L, Beaulieu JM. Inhibition of GSK3 by lithium, from single molecules to signaling networks. *Front Mol Neurosci.* 2012 Jan 27;5:14.
- Adli M, Hollinde DL, Stamm T, et al. Response to lithium augmentation in depression is associated with the glycogen synthase kinase 3-beta -50T/C single nucleotide polymorphism. *Biol Psychiatry.* 2007 Dec 1;62(11):1295-302.

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- With age, our bifidobacteria levels <u>decline</u> to as little as 5%, creating gut imbalance.¹
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Item #02203 • 60 chewable tablets 1 bottle \$15

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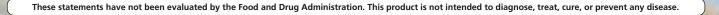
4 bottles \$13 each

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



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

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Natural killer cell activity declines with normal aging, which can affect immune function.

NK Cell Activator[™] supports healthy natural killer cell activity to promote a robust immune response.¹⁻³

Functional NK cells also recognize and eliminate **senescent cells** that accumulate in aged tissues.

The standardized plant extract in **NK Cell** Activator[™] supports the activity of **natural** killer (NK) cells.

Clinical Studies

In one clinical study, scientists documented a **3-fold** increase of **natural killer** cell activity in healthy individuals within three to four weeks of receiving **500 mg** daily of the rice bran compound found in **NK Cell Activator**[™].

In another double-blind, randomized, placebo-controlled study, researchers noted that subjects taking the rice-bran compound found in **NK Cell Activator™** experienced a boost in *myeloid dendritic cells*—cells that act as key messengers between the innate and the adaptive immune systems.⁴

The suggested single serving of <u>one</u> vegetarian tablet of **NK Cell Activator**[™] provides:

Proprietary Enzymatically Modified Rice Bran

500 mg

Contain wheat.

References

1. Curr Opin Virol. 2011 Dec;1(6):497-512.

2. *Clin Exp Immunol*. 1987 May;68(2):340-7.

- 3. Immunology. 2009 Oct;128(2):151-63.
- 4. Cancer Immunol Immunother. 2013 Mar;62(3):437-45.

For full product description and to order **NK Cell Activator**[™], call 1-800-544-4440 or visit www.LifeExtension.com Boost "Functional" Natural Killer Cell Activity



Supports Healthy Natural Killer Cell Function

30 VEGETARIAN DUETARY

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LITHIUM



In areas where **lithium** is naturally abundant in the drinking water, people tend to **live longer**, healthier lives.¹⁻³

Lithium is a *low-cost* mineral that supports cognition, cell **DNA**, and healthy aging.³⁻⁵

Lithium Orotate (1000 mcg of lithium per tiny cap) Item # 02403 • 100 Vegetarian Capsules

> 1 bottle **\$12** 4 bottles \$10.50 each

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Lithium

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

References

- 1. Appl Physiol Nutr Metab. 2018 Apr;43(4):412-4.
- 2. J Clin Psychiatry. 2015 Mar;76(3):319-26.
- 3. Eur J Nutr. 2011 Aug;50(5):387-9.
- 4. J Alzheimers Dis. 2015;48(2):403-10.
- 5. JAMA Psychiatry. 2017 Oct 1;74(10):1005-10.

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30 | LIFE EXTENSION | MAY 2020

BY MICHAEL DOWNEY

Probioticphage Blend Fights Digestive Problems and Boosts Immune Defenses Gas. Bloating. Stomach pain. Diarrhea.

As many as **74%** of Americans suffer from these and similar **digestive problems**.¹

Up to **15%** of U.S. adults live with chronic **irritable bowel syndrome**.²

An underlying cause of many of these conditions is an imbalance of good to bad **bacteria** in our gut.³⁻⁵

Health-conscious people know the value of taking a quality **probiotic**. These healthpromoting bacteria help rebalance the **gut microbiota**.

Now there is a way to make **probiotics** even *more* powerful and *more* effective.

Research shows that when **7** specific **pro-biotics** *and* **4** types of **bacteriophages** are used *in combination*, harmful bacteria are reduced, allowing beneficial bacteria to grow to as many as **thousands of times** their baseline rate.^{6,7}

Bacteriophages are tiny packages of DNA or RNA wrapped in protein that seek out and **selectively eliminate only harm***ful bacteria*.⁸ This encourages healthy bacteria to rapidly multiply and thrive.

Combining probiotics and bacteriophages in a protective **dual-encapsulation** format provides an innovative solution for digestive and overall systemic health.

The Importance of a Healthy Microbiome

The **gut microbiota**—the trillions of microorganisms in the gastrointestinal tract⁹—play a critical role in health and disease.

The balance of good to bad bacteria can be disrupted by age, medication, stress, or a diet heavy in processed carbohydrates, meats, fats, preservatives, and other additives.^{3,10,11}

Antibiotic overuse also wreaks havoc on the gut microbiota, killing both bad *and* healthy bacteria.^{12,13}

An **imbalance** in the ratio of good to bad bacteria can trigger the development of digestive problems like gas, diarrhea, bloating, and stomach pain.

It can also lead to **irritable bowel syndrome**, a chronic condition causing these and other symptoms, including cramping and constipation.

The solution is to shift your gut microbiota toward a healthy balance, which can resolve digestive issues and improve overall health.⁹

Giving Probiotics a Boost

Oral **probiotics** have proven an effective way to increase levels of **beneficial bacteria**.¹⁴

But they can have difficulty competing with the more aggressive, **harmful microbes** in the gut.



Scientists have found a way to give probiotics a huge advantage: combining the probiotics with a technique known as **phage therapy**.

This approach uses **bacteriophages**, or **phages** for short, to selectively reduce *only harmful bacteria*.

That clears the way for beneficial probiotic organisms to flourish and more fully restore the microbiome to a healthy, balanced state.¹⁵

What exactly are bacteriophages?

They're submicroscopic packages of DNA or RNA enclosed in a protein envelope.⁸ Each one is chosen for its targeted ability to attach to a particular strain of *unwanted* bacteria (like *E. Coli*) in the intestines.

The Origins of Phage Therapy

Phage therapy has a long history.

Scientists pioneered the use of bacteriophages in Eastern Europe before World War I.^{8,16,17}

By the 1940s, corporations such as Eli Lilly and L'Oréal had developed bacteriophage "cocktails" as a highly effective treatment for infections.¹⁸

The development of powerful **antibiotics** soon pushed this approach into the background.

But antibiotics eliminate both harmful *and* healthy bacteria, leaving us vulnerable to attack by other organisms.¹⁹ Bacteriophages eliminate *only* detrimental bacteria.

Recognizing bacteriophages' targeted activity, the food industry now uses them to reduce dangerous bacteria, from *Listeria* to *E. coli* to *Salmonella*.²⁰⁻²²

Taken orally, phages provide protection both in the **large intestine**, where bacterial imbalance occurs, and in the **small intestine**, where bacterial overgrowth can occur. They are effective in small doses and work within hours.⁶

By *combining* probiotics and phage therapy, scientists have documented an **exponential increase** in beneficial bacteria and a similar **decrease** in harmful bacteria.²³⁻²⁵

Cell-Based Studies

Researchers demonstrated the effectiveness of a specific mix of <u>four</u> bacteriophages in studies using *E. coli* bacteria.

E. coli (*Escherichia coli*) can cause diarrhea, urinary tract infections, pneumonia, and other illnesses,²⁶ and crowd out beneficial organisms.



The researchers cultured healthy *Bifidobacterium longum* in two Petri dishes along with *E. coli*. A bacteriophage mixture was added to just <u>one</u> dish.⁶

Five hours later, there was little growth of *B. longum* in the dish <u>without</u> bacteriophages. This health-promoting strain (*B. longum*) could not compete with *E. coli*.⁶

But in the dish *also* containing **bacteriophages**, *B. longum* colonies rocketed to more than **7,000 times** the numbers compared to those in the untreated (without **phages**) dish.⁶

The bacteriophages had selectively targeted and eliminated *E. coli*, making room for the beneficial *B. longum* bacteria to multiply.

Scientists conducted the same experiment using beneficial *Lactobacillus acidophilus* instead of *B. longum*.

Again, the *E. coli* suppressed growth of *L. acidophilus* in the untreated culture. But in the Petri dish containing *bacteriophages*, *L. acidophilus* colony counts were **20-fold** *higher* than in the other culture.⁶

The beneficial *Bifidobacterium bifidum* bacteria combined with **bacteriophages** also showed impressive results.⁶

To further validate these findings, scientists moved on to laboratory animals.

WHAT YOU NEED TO KNOW

Upgrade Probiotics with Bacteriophages

- An imbalance in our gut bacteria is a cause of digestive problems like bloating, gas, and diarrhea.
- Taking probiotics, beneficial bacteria, can fix that imbalance and dramatically ease gastrointestinal distress.
- Scientists have developed a way to make probiotics far more effective: combining them with **bacteriophages**, packages of DNA or RNA wrapped in protein.
- These "phages" selectively target and eliminate only undesirable bacteria while encouraging beneficial probiotic organisms to flourish.
- Researchers have now identified seven specific probiotic strains that improve digestive health and increase their populations by an average of 30 times when taken with a unique four-bacteriophage blend.
- Scientists have combined these seven strains and the phage blend in a dualencapsulation form that ensures they survive the harsh stomach environment and populate the gut.

Animal Studies

The probiotic **B.** *longum* was given to a group of mice, along with a disease-causing *E. coli* strain. A second group received the same mixture *plus* the **phage** blend specifically designed to target *E. coli*.⁷

Just 24 hours later, the phage-treated mice had:7

- About a 10-fold <u>decrease</u> in *E. coli* in the small intestine,
- About a 100-fold <u>decrease</u> in *E. coli* in the large intestine, and
- About a **100-fold** <u>decrease</u> in *E. coli* in fecal matter.

The phage-treated group also had:7

- About a 100-fold <u>increase</u> in *B. longum* in the small intestine,
- About a 100-fold <u>increase</u> in *B. longum* in the large intestine, and
- About a **40-fold** <u>increase</u> in *B. longum* in fecal matter.

This translated into clear benefits: Phage-treated mice had **improved digestive function** with no detrimental side effects.

By contrast, mice treated only with *E. coli* and *B. longum*, without the added **phages**, became constipated. Intestinal segments showed swelling, redness, and leaks.⁷



As a result of these and other studies, scientists have begun adding **bacteriophages** to **probiotics** to make a more effective, enhanced probiotic formula.

Probiotic Strains Boosted by Phages

Recent research has identified **seven** specific **probiotic strains** that have two important benefits for digestive health:

- 1. Each probiotic is documented to improve an array of digestive symptoms.^{4,5,27-35}
- 2. Each probiotic's colony *numbers are greatly increased* when taken *with* a carefully developed **bacteriophage** mix.⁷

The seven strains in this probiotic blend are *enhanced by an average of* **30 times** when combined with the mix of **four bacteriophages.**³⁶

Every single one of these probiotics has been shown in studies to improve **irritable bowel** syndrome.^{5,27-31}

Safety Profile

Bacteriophages are found almost everywhere—from soil, hot springs, and the ocean depths, to the animal and human body.³⁷

They have been successfully and safely used in numerous **human** clinical and therapeutic settings.³⁸⁻⁴⁰

In fact, **phage therapy** has been used to treat infections of the gastrointestinal tract, skin, head and neck, bone, chest, and abdomen.^{16,38,41}

And they have successfully targeted disease-causing bacteria such as *Staphylococcus*, *Streptococcus*, *E. coli*, *Salmonella*, and *Pseudomonas*.^{16,38,41}

Evidence suggests that success rates for phage therapy may range up to **80%** to **95%** with either no side effects, or only mild and reversible ones.^{16,38,41}

Together with **probiotics**, which also have a long history of safe use, they're a powerful way to promote digestive health.

They've also demonstrated the ability to benefit an array of other **gastrointestinal issues:**

- *B. longum SP54*, *L. paracasei IMC502*, and *L. rhamnosus IMC501* provide antimicrobial effects against Candida (an infection-causing fungus), *H. pylori* (bacteria that can cause ulcers), and *E. coli*.^{27,32,34}
- B. lactis BLC1 and L. acidophilus LA1 relieve symptoms of ulcerative colitis (a disease that causes inflammation and ulcers in the colon)³³ and ease lactose intolerance.³⁵
- **B. breve Bbr8** and **L. plantarum 14D** reduce symptoms of **celiac disease**, which can include diarrhea, bloating, and gas.^{4,5}

Researchers have combined these seven specific **probiotic strains** with the **bacteriophage blend** for comprehensive gut health.

Because not all commercial probiotics reach their intended target, a **dual-encapsulation** format was developed.

By protecting the beneficial bacteria from stomach acids that would otherwise destroy them, this more effectively promotes healthy intestinal colonization.

Summary

Many **digestive problems**, like diarrhea, gas, and stomach pain, are caused by an imbalance in the gut microbiome.

Probiotics can correct this imbalance, improving gastrointestinal comfort and overall health.

Taking probiotics *with* **bacteriophages**, which target and eliminate only unhealthy microbes, allows **beneficial** bacteria to multiply at a vastly greater rate.

Scientists have identified seven specific **probiotic strains that improve digestive symptoms** *and* boost their intestinal colonies by an average of **30 times** when taken with a specific blend of four bacteriophages.

A unique **dual-encapsulation** process protects these probiotics from stomach acids that would otherwise destroy them, enabling them to make it to the gut and thrive.

As you'll see on the next page, **probiotics** have also demonstrated **anti-viral** properties by enhancing **immune** defenses. •

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



How Bacteriophages Differ from Antibiotics

Antibiotics are one of the 20th century's greatest scientific discoveries.

But decades of widespread antibiotic use have created "superbugs" that are largely resistant to current antibiotics.

In severe cases, physicians desperately search for alternatives to save patients' lives.

This has prompted excitement about **bacteriophages**.

Eastern European doctors were successfully neutralizing bacterial infections with **phage therapy**, a treatment aimed at selectively targeting and destroying harmful bacteria.

With the rise in antibiotic-resistant bacteria, phage therapy is experiencing a revival in the scientific community because of its effectiveness and safety.

Phage cocktails have been shown to effectively treat common bacterial invaders, including *staph, strep,* and *E. coli*.²³⁻²⁵

Phage therapy also encourages growth of healthy bacteria in the gut microbiome, which can further reduce harmful bacteria.

Probiotics Defend Against Viral Infections of the Respiratory Tract



It may come as a surprise that consuming beneficial probiotic *bacteria* could have a beneficial effect on the **respiratory tract** and *viral* **illnesses**. There is a *strong* connection between gut flora and protection of the respiratory tract from viruses.

The connection exists because both the intestinal and respiratory **mucosa** have similar characteristics and structures.

The mucosa is the primary site where most common viruses—including those that cause the common cold, flu, and new coronavirus—gain entry into the body. For this reason, they can be considered the "front lines" of the battle against many viral illnesses.

Ideally, the mucosa of the digestive and respiratory tracts is protected from infection by a number of reinforcements. Collectively known as the **mucosal defense system**, these help to keep potentially harmful viruses and bacteria at bay while allowing *healthy* **probiotics** to thrive.

Unfortunately, these defense systems are not always in top form and cannot prevent all infectious illnesses. This is particularly true with advancing age, when **mucosal immunosenescence** leads to waning mucosal defenses, making viral illnesses more likely and potentially more dangerous.⁴² Other chronic diseases that weaken immune defenses can further compound the problem. Fortunately, we can do something about it.

Research has revealed that **probiotics** stimulate and boost mucosal defenses, both for the gastrointestinal *and* respiratory systems.⁴³⁻⁴⁶ While many of the probiotic organisms consumed may end up in the gut, some colonize parts of the respiratory tract as well.⁴⁷ The mucosal defense systems get activated by these healthy organisms, guarding against real threats, including viruses.

In addition, healthy bacteria in probiotic foods and supplements help amplify general systemic immune functions as well, getting the body ready to fight off infection more effectively should one occur. These <u>two</u> effects of probiotics—shielding the mucosa and boosting immune function—work together to both decrease the incidence of **viral** infections and to reduce their severity if they do occur. This effect has been demonstrated in **human** clinical trials.

Several small studies have found that probiotics have beneficial effects against respiratory tract infections.^{44,46} A recent review of the existing literature concluded that probiotics had a positive influence on several outcome measures.⁴⁴ In addition to reducing the total number of respiratory tract infections, they also reduced the average length of illness, use of antibiotics, and school absences, in cases where viral outbreaks occur.

One study evaluated a blend of probiotics that includes some of the very same bacterial species discussed in this article, *B. lactis*, *L. plantarum*, and *L. rhamnosus*.⁴⁸ The study scientists randomized 250 healthy adults to receive this **probiotic** blend or a **placebo** daily for 90 days during peak flu season.

The impact this probiotic treatment had on respiratory infections was not subtle! The number of flu and flu-like viral illnesses were reduced by an impressive **75%**. The rate of colds—also a viral illness—was also reduced, by **39%**. In the small number of subjects on the probiotic supplement who *did* get sick, probiotics still had a beneficial impact, reducing both the severity and duration of viral illness. Symptom severity in flu was reduced by **37**%.

The length of illness was also reduced, by about one day on average for colds, three days for cough, and close to one-and-a-half days for all acute upper respiratory tract infections overall.

With respiratory tract viral illness—from common cold and flu to new threats on the rise, probiotic supplementation may provide an added layer of protection from infection.

In addition to standard precautions such as hand washing and avoiding contact with sick individuals, probiotic supplements may help to reduce viral illness risk and severity by bolstering mucosal defenses and general immune function.



References

- 1. Available at: https://www.foxnews.com/health/survey-shows-74-percent-of-americans-living-with-gi-discomfort. Accessed February 4, 2020.
- Available at: https://gi.org/topics/common-gi-symptoms/. Accessed February 4, 2020.
- Brown K, DeCoffe D, Molcan E, et al. Diet-induced dysbiosis of the intestinal microbiota and the effects on immunity and disease. Nutrients. 2012 Aug;4(8):1095-119.
- Cristofori F, Indrio F, Miniello VL, et al. Probiotics in Celiac Disease. Nutrients. 2018 Nov 23;10(12).
- Francavilla R, Piccolo M, Francavilla A, et al. Clinical and Microbiological Effect of a Multispecies Probiotic Supplementation in Celiac Patients With Persistent IBS-type Symptoms: A Randomized, Double-Blind, Placebo-controlled, Multicenter Trial. *J Clin Gastroenterol.* 2019 Mar;53(3):e117-e25.
- Supplier Internal Study. A Probiotic-Enhancing Prebiotic. Data on File. 2016.
- Supplier Internal Study. Bacteriophage Cocktail Mice Clinical Trials-Data on File. 2016.
- Pelfrene E, Willebrand E, Cavaleiro Sanches A, et al. Bacteriophage therapy: a regulatory perspective. *J Antimicrob Chemother*. 2016 Aug;71(8):2071-4.
- Khanna S, Tosh PK. A clinician's primer on the role of the microbiome in human health and disease. *Mayo Clin Proc.* 2014 Jan;89(1):107-14.
- Pendyala S, Walker JM, Holt PR. A high-fat diet is associated with endotoxemia that originates from the gut. *Gastroenterology*. 2012 May;142(5):1100-1 e2.
- Van den Abbeele P, Verstraete W, El Aidy S, et al. Prebiotics, faecal transplants and microbial network units to stimulate biodiversity of the human gut microbiome. *Microb Biotechnol.* 2013 Jul;6(4):335-40.
- Francino MP. Antibiotics and the Human Gut Microbiome: Dysbioses and Accumulation of Resistances. Front Microbiol. 2015;6:1543.
- 13. Watkins RR, Bonomo RA. Overview: Global and Local Impact of Antibiotic Resistance. *Infect Dis Clin North Am.* 2016 Jun;30(2):313-22.
- Azad MAK, Sarker M, Li T, et al. Probiotic Species in the Modulation of Gut Microbiota: An Overview. *Biomed Res Int.* 2018;2018:9478630.
- Mimee M, Citorik RJ, Lu TK. Microbiome therapeutics Advances and challenges. Adv Drug Deliv Rev. 2016 Oct 1;105(Pt A):44-54.
- Abedon ST, Kuhl SJ, Blasdel BG, et al. Phage treatment of human infections. *Bacteriophage*. 2011 Mar;1(2):66-85.
- 17. Bruynoghe R, and J. Maisin. Essais de thérapeutique au moyen du bacteriophage. C. R. Soc. Biol. 1921;85:1120-1.
- Moelling K, Broecker F, Willy C. A Wake-Up Call: We Need Phage Therapy Now. *Viruses*. 2018 Dec 5;10(12):688.
- 19. Chan BK, Abedon ST, Loc-Carrillo C. Phage cocktails and the future of phage therapy. *Future Microbiol.* 2013 Jun;8(6):769-83.
- Garcia P, Martinez B, Obeso JM, et al. Bacteriophages and their application in food safety. Lett Appl Microbiol. 2008 Dec;47(6):479-85.
- Sillankorva SM, Oliveira H, Azeredo J. Bacteriophages and their role in food safety. *Int J Microbiol*. 2012;2012:863945.
- Woolston J, Parks AR, Abuladze T, et al. Bacteriophages lytic for Salmonella rapidly reduce Salmonella contamination on glass and stainless steel surfaces. *Bacteriophage*. 2013 Jul 1;3(3):e25697.
- Chibeu A, Lingohr EJ, Masson L, et al. Bacteriophages with the ability to degrade uropathogenic Escherichia coli biofilms. *Viruses*. 2012 Apr;4(4):471-87.
- 24. Dalmasso M, de Haas E, Neve H, et al. Isolation of a Novel Phage with Activity against Streptococcus mutans Biofilms. *PLoS One*. 2015;10(9):e0138651.
- 25. Kazmierczak Z, Gorski A, Dabrowska K. Facing antibiotic resistance: Staphylococcus aureus phages as a medical tool. *Viruses.* 2014 Jul 1;6(7):2551-70.
- Available at: https://www.cdc.gov/ecoli/general/index.html. Accessed February 4, 2020.
- Verdenelli MC, Silvi S, Cecchini C, et al. Influence of a combination of two potential probiotic strains, Lactobacillus rhamnosus IMC 501(R) and Lactobacillus paracasei IMC 502(R) on bowel habits of healthy adults. *Lett Appl Microbiol.* 2011 Jun;52(6):596-602.

- 28. Alm L, Ryd-Kjellen E, Setterberg G, et al. Effect of a new fermented milk product 'CULTURA'on constipation in geriatric patients. Paper presented at: 1st Lactic Acid Bacteria Computer Conference Proceedings. Horizon Scientific Press, Norfolk, England1993.
- Black F, Andersen P, Ørskov J, et al. Prophylactic efficacy of lactobacilli on traveler's diarrhea. *Travel Medicine: Springer*; 1989:333-5.
- 30. Silvi S, Verdenelli MC, Cecchini C, et al. Probiotic-enriched foods and dietary supplement containing SYNBIO positively affects bowel habits in healthy adults: an assessment using standard statistical analysis and Support Vector Machines. *Int J Food Sci Nutr.* 2014 Dec;65(8):994-1002.
- Yaeshima T, Takahashi S, Matsumoto N, et al. Effect of Yogurt Containing Bifidobacterium longum BB536 on the Intestinal Environment, Fecal Characteristics and Defecation Frequenc. 1997;16(2):73-7.
- Coman MM, Verdenelli MC, Cecchini C, et al. In vitro evaluation of antimicrobial activity of Lactobacillus rhamnosus IMC 501((R)), Lactobacillus paracasei IMC 502((R)) and SYNBIO((R)) againstpathogens. J Appl Microbiol. 2014 Aug;117(2):518-27.
- 33. Laake KO, Bjorneklett A, Aamodt G, et al. Outcome of four weeks' intervention with probiotics on symptoms and endoscopic appearance after surgical reconstruction with a J-configurated ileal-pouchanal-anastomosis in ulcerative colitis. *Scand J Gastroenterol.* 2005 Jan;40(1):43-51.
- Namba K, Yaeshima T, Ishibashi N, et al. Inhibitory Effects ofBifidobacterium longumon EnterohemorrhagicEscherichia coliO157: H7. 2003;22(3):85-91.
- 35. Virta PJER, Pharmacia, Finland. The Effect of a Preparation Containing Freeze-Dried Lactic Acid Bacteria [L. acidophilus LA-5 (LA-1) and Bifidobacterium TB-12] on Lactose Intolerance. 1993.
- 36. Unpublished Internal Data Provided by Deerland. 2020.
- 37. Dabrowska K, Switala-Jelen K, Opolski A, et al. Bacteriophage penetration in vertebrates. *J Appl Microbiol*. 2005;98(1):7-13.
- Sarker SA, McCallin S, Barretto C, et al. Oral T4-like phage cocktail application to healthy adult volunteers from Bangladesh. *Virology*. 2012 Dec 20;434(2):222-32.
- 39. Bruttin A, Brussow H. Human volunteers receiving Escherichia coli phage T4 orally: a safety test of phage therapy. *Antimicrob Agents Chemother*. 2005 Jul;49(7):2874-8.
- McCallin S, Alam Sarker S, Barretto C, et al. Safety analysis of a Russian phage cocktail: from metagenomic analysis to oral application in healthy human subjects. Virology. 2013 Sep 1;443(2):187-96.
- Alisky J, Iczkowski K, Rapoport A, et al. Bacteriophages show promise as antimicrobial agents. J Infect. 1998 Jan;36(1):5-15.
- Fujihashi K, Kiyono H. Mucosal immunosenescence: new developments and vaccines to control infectious diseases. Trends Immunol. 2009 Jul;30(7):334-43.
- 43. Forsythe P. Probiotics and lung diseases. Chest. 2011 Apr;139(4):901-8.
- Hao Q, Dong BR, Wu T. Probiotics for preventing acute upper respiratory tract infections. Cochrane Database Syst Rev. 2015 Feb 3(2):CD006895.
- Isolauri E, Sutas Y, Kankaanpaa P, et al. Probiotics: effects on immunity. Am J Clin Nutr. 2001 Feb;73(2 Suppl):444S-50S.
- Lehtoranta L, Pitkaranta A, Korpela R. Probiotics in respiratory virus infections. Eur J Clin Microbiol Infect Dis. 2014 Aug;33(8):1289-302.
- 47. Tapiovaara L, Lehtoranta L, Swanljung E, et al. Lactobacillus rhamnosus GG in the middle ear after randomized, double-blind, placebo-controlled oral administration. Int J Pediatr Otorhinolaryngol. 2014 Oct;78(10):1637-41.
- Pregliasco F, Anselmi G, Fonte L, et al. A new chance of preventing winter diseases by the administration of synbiotic formulations. J Clin Gastroenterol. 2008 Sep;42 Suppl 3 Pt 2:S224-33.

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> **References** 1. Food Chem. 2013;139(1-4):129-37. 2. Panminerva Med. 2014;56(3 Suppl 1):1-6.

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The Rising Rate of Obesity and Its Consequences



BY CHANCELLOR FALOON

In February 2020, the Centers for Disease Control and Prevention presented data on obesity rates in the United States.

The results showed a startling 42.4% of adults are obese.¹

An additional **31.8%** were **overweight**, according to a prior study.2

The situation is projected to worsen.

A study published in the New England Journal of Medicine estimates that by 2030 the percentage of obese American adults will rise to **48.9%**.³

The increase in medical costs due to obesity are around \$3,429 per obese person per year.⁴ This totals over **\$446 billion** annually.

Unless the rise in obesity rates is prevented, the financial burden for obesity-related medical costs will skyrocket in the next decade.

Women, African Americans, and those with a low socioeconomic status are affected at a significantly higher rate.³

Excess body weight increases the risk of developing and dying from a broad spectrum of cardiovascular diseases, cognitive disorders such as Alzheimer's, and at least 13 different types of cancers.5-7

Obesity has been determined to be the underlying cause of approximately 20% of deaths in the United States.8

A collaborative analysis (900,000 individuals from 57 studies) published in 2009 found that every 5-point increment in BMI (a weight-to-height ratio) was associated with a 30% increased mortality risk.9

We are in the middle of a surging **obesity epidemic**. Much as public warnings against tobacco use, which debuted in 1964, have had to be repeated over and over to induce meaningful reductions in cigarette smoking.

The public needs continual reminders about the danger posed by obesity and what can be done to reduce excess body weight.



Foods that Kill

There are many factors that are contributing to the rise in obesity rates.

Lifestyles and occupations are more sedentary, while more unhealthy, **ultra-processed foods** are being consumed.^{11,12}

A **processed food** tends to be high in added sugar, salt, oil, and unhealthy fats.

Ultra-processed foods are so altered that they hardly resemble their original whole-food state.

An *ultra*-processed food can be thought of as an industrial product.

In addition to having the bad qualities of a processed food, an **ultra-processed** food contains ingredients that are rarely added to homecooked meals, such as

Medical Definition of Obesity

The Obesity Medicine Association defines **obesity** as a:

"... chronic, relapsing, multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences."¹⁰



modified starches or hydrogenated oils. An ultraprocessed food also commonly uses additives that mimic the sensorial qualities of raw food or disguises undesirable qualities of the finished product such as emulsifiers, humectants, and sequestrants.

Living 10 Years Longer

Ultra-processed foods are often "ready-to-eat" or require minimal preparation, and are highly marketed and branded.¹²

Some examples of these types of foods are carbonated and artificially flavored drinks, ice cream, breakfast cereals, chips, and heat-and-serve dishes.

Ultra-processed foods account for more than **60%** of dietary energy in the U.S.¹³

Populations that have the <u>lowest</u> intake of ultraprocessed foods—in Sardinia, Italy; Ikaria, Greece; Okinawa, Japan; Loma Linda, California, and Nicoya, Costa Rica—live an average of **10 years longer** than those with a standard diet in the **U.S.**¹¹

An observational study of Spanish university graduates followed participants for a median of **10.4** years. Consumption of an average of **5.3 servings** of ultraprocessed food per day, compared to an average of less than **1.5 servings** per day, was associated with a **62%** <u>increased</u> risk for all-cause mortality. For each additional serving, this risk increased by **18%**.¹⁴

The Effects of Diet Soda vs. Regular Soda

A **meta-analysis** published in 2017 found that regular consumption of sugar-sweetened soda was associated with an **18%** increased risk of obesity.¹⁵

More surprisingly, regular consumption of artificially-sweetened diet soda was associated with a **59%** increased risk of obesity.¹⁵

One might assume that diet soda is healthier than regular soda, due to the minimal calorie content. However, **artificial sweeteners** can lead to significant changes in the **gut microbiota**, an effect that is believed to at least partially explain the *obesogenic* effect of diet soda.^{15,16}

Human and animal research show that non-caloric artificial sweeteners cause alterations in gut microbiota composition that impair glucose tolerance, resulting in poor metabolic responses.^{15,16}

In a large-scale observational study in postmenopausal women, with an average of 8.4 years of follow-



up, drinking two or more **diet sodas** per day increased the risk of type II diabetes by **21%** compared to women who drank less than one diet soda per week. But the risk was more than doubled to **43%** in women drinking the same amount of sugar-sweetened soda.¹⁷

More research is needed to fully understand this association. But the key is that research has shown both types of sodas to be harmful to our health.

Being Overweight or Underweight is Not Healthy

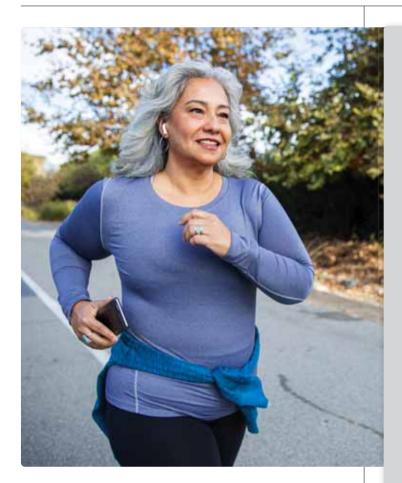
It is a commonly held belief that as long you're not obese you can be overweight and still be healthy. This is not always true. Studies have shown significant dangers associated with being overweight compared to a normal weight.

An observational study published in the *New England Journal of Medicine* in 2010 followed **1.46 million** white adults for a median of **10 years**. Those who had preexisting illnesses or were cigarette smokers were excluded from this study analysis.¹⁸

The results showed that those who were overweight (BMI 25-29.9) had a **13%** increased risk of death compared to those who were normal weight. Additionally, out of the patients who participated in the study longest (followed for **15 years** or more), there was a **12%** to **19%** increased risk of mortality in the overweight group compared to the normal weight group. Among this group, higher weight was associated with a higher risk of dying.

The Dangers of Obesity

- Obesity rates in the U.S. are skyrocketing. By 2030, it's projected that nearly 50% of American adults will be obese.
- Genetics play a role, but sedentary lifestyle and diets heavy in ultraprocessed foods (carbonated and artificially flavored drinks, ice cream, breakfast cereals, chips, and heat-andserve dishes) are largely responsible for the increase in rates of obesity.
- The diet with the most research supporting its use for weight loss and overall health is the Mediterranean diet, which is high in vegetables, fruits, whole grains, beans, nuts and seeds, extra virgin olive oil, fish and seafood, and includes moderate amounts of poultry, eggs, and dairy, with only very occasional meats and sweets.
- The AMPK-activating drug metformin can also aid in weight loss. An extract of the plant species Gynostemma pentaphyllum works in the same way, and has been shown to reduce belly fat, BMI, and other indicators of obesity.



In a more recent study, researchers compared the **heart rate variability** of underweight, normal weight, and overweight adult women.¹⁹

Heart rate variability measures the differences in the time interval between each heartbeat. It is conventionally measured with an electrocardiogram, though there are now smartwatches and small devices that can test it as well.

A heart rate that is <u>more</u> variable at rest is most beneficial, as this allows you to respond better to stress. Those who have a more variable resting heart rate also have better exercise performance and decreased risk of cardiac disease.²⁰

The results of this study revealed that those who were underweight (BMI < 18.5) and those who were overweight had reduced heart rate variability compared to normal weight individuals. A special analysis revealed a U-shaped curve, where too little or too much fat mass was associated with worse heart rate variability.¹⁹ In other words, individuals with a healthy BMI of 18.5 to 24.9 and healthy extent of fat mass have a higher resting heart rate variability.

Additional Negative Effects of Excess Weight

- Excess weight increases the risk for an array of serious conditions: fatty liver disease, kidney disease, gallbladder disease, and sleep apnea.^{22,23}
- Being overweight or obese is associated with an increased risk of chronic pain and pain syndromes, including low-back pain, headaches, irritable bowel syndrome and abdominal pain, fibromyalgia, jaw pain, and body-wide chronic pain. A study in twins found that compared to their normal weight twin, obese or overweight twins had significantly higher odds of low-back pain or generalized body pain, respectively.^{24,25}
- Excess weight promotes osteoarthritis as a result of both increased wear and tear, and because of increased chronic inflammation.²⁶
- Obesity is strongly associated with depression. A meta-analysis that included data on over 58,000 individuals found that obesity significantly increased the odds of developing depression, while depression significantly increased the odds of becoming obese.²⁷
- A host of negative pregnancy outcomes, such as gestational diabetes, pre-eclampsia, caesarean birth, fetal defects, and preterm birth are all more common in overweight or obese mothers.²⁸
- Excess weight makes it more difficult to absorb vitamin D and other fat-soluble vitamins.²⁹

A noteworthy study published in **2015** showed a significant relationship between a BMI <u>over 25</u> and postmenopausal invasive breast cancer incidence.²¹

The researchers pooled data from **67,142** postmenopausal women from a previous clinical trial and followed them for a median of 13 years. The results showed a **positive relationship** between BMI and the incidence of invasive breast cancer. Those who were overweight had a **17%** increased risk and those who were obese had as much as a **58%** increased risk.²¹

An Optimal Diet

Life Extension[®] has written extensively about the benefits of certain diets and compounds to maintain healthy weight and support longevity.

Although there are numerous data regarding the health benefits of vegetarian or vegan diets, we believe that the **Mediterranean diet** has garnered the greatest research support.³⁰⁻³²

A meta-analysis of randomized, controlled trials concluded that following a Mediterranean diet may be useful to reduce body weight, especially when it is energy-restricted, combined with physical activity, and sustained for more than six months.³³

A **Mediterranean diet** is high in vegetables, fruits, whole grains, beans, nuts and seeds, extra-virgin olive oil, fish and seafood, moderate amounts of poultry, eggs, and dairy products. Red meat and sweets are limited.^{34,35}

Whatever the dietary pattern, one that emphasizes whole, mostly **unprocessed** foods will yield significant health benefits over the typical Western diet, which is high in **ultra-processed** foods.

A recent meta-analysis evaluated the mortality benefit of weight loss diets. The analysis included studies that lasted for a median duration of only two years, yet still found that these diets resulted in an **18% relative reduction** in all-cause mortality.³⁶

Compounds that Aid in Weight Loss

Life Extension[®] has long been one of the most vocal proponents of the incredible and multi-targeted benefits of **metformin**. It is an FDA-approved drug to treat type II diabetes. In addition to a remarkable list of benefits, studies show that it can also aid in weight loss.³⁷

An extract of the plant species *Gynostemma pen-taphyllum* has been shown to work on one of the same mechanisms that metformin does, by activating the enzyme **AMPK** (adenosine-monophosphate protein kinase).³⁸

<u>Activated</u> AMPK mimics some of the most important benefits of calorie restriction and exercise by increasing insulin sensitivity and glucose utilization.

Daily intake of *Gynostemma* extract for 12 weeks was shown in a study to result in significant reductions in body weight, total abdominal fat area, body fat mass, percent body fat, and BMI, compared to a placebo group of comparably obese patients.³⁹

Summary

If Americans continue to opt for more sedentary lifestyles and consume more ultra-processed foods, obesity will continue to rise at an exponential and alarming rate.

If current trends continue, almost **50%** of the American population will be obese by **2030**, resulting in catastrophic health consequences.

Being overweight or obese increases the risk of the most prevalent diseases afflicting humankind. The financial costs to our healthcare system are unsustainable.

While the media have been sounding the alarm on this issue for decades, not nearly enough is being done to help Americans attain and maintain healthy weight, to avoid terrible and deadly diseases, and to enjoy their lives to the fullest.

We need to be better informed and motivated about maintaining a healthy body weight. •

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.cdc.gov/nchs/data/databriefs/db360-h.pdf. Accessed March 2, 2020.
- Available at: https://www.cdc.gov/nchs/fastats/obesity-overweight. htm. Accessed January 30, 2020,
- Ward ZJ, Bleich SN, Cradock AL, et al. Projected U.S. State-Level Prevalence of Adult Obesity and Severe Obesity. N Engl J Med. 2019 Dec 19;381(25):2440-50.
- Biener A, Cawley J, Meyerhoefer C. The High and Rising Costs of Obesity to the US Health Care System. J Gen Intern Med. 2017 Apr;32(Suppl 1):6-8.
- Alford S, Patel D, Perakakis N, et al. Obesity as a risk factor for Alzheimer's disease: weighing the evidence. *Obes Rev.* 2018 Feb;19(2):269-80.
- Avgerinos KI, Spyrou N, Mantzoros CS, et al. Obesity and cancer risk: Emerging biological mechanisms and perspectives. *Metabolism.* 2019 Mar;92:121-35.
- 7. Koliaki C, Liatis S, Kokkinos A. Obesity and cardiovascular disease: revisiting an old relationship. *Metabolism*. 2019 Mar;92:98-107.
- Available at: https://emedicine.medscape.com/article/123702overview#a5. Accessed February 25, 2020.
- Prospective Studies C, Whitlock G, Lewington S, et al. Body-mass index and cause-specific mortality in 900 000 adults: collaborative analyses of 57 prospective studies. Lancet. 2009 Mar 28;373(9669):1083-96.
- Available at: https://obesitymedicine.org/definition-of-obesity/. Accessed February 25, 2020.
- Laster J, Frame LA. Beyond the Calories-Is the Problem in the Processing? Curr Treat Options Gastroenterol. 2019 Dec;17(4):577-86.
- Available at: https://worldnutritionjournal.org/index.php/wn/article/ view/5/4. Accessed February 25, 2020.
- Gupta S, Hawk T, Aggarwal A, et al. Characterizing Ultra-Processed Foods by Energy Density, Nutrient Density, and Cost. *Front Nutr.* 2019 2019-May-28;6(70):70.
- Rico-Campa A, Martinez-Gonzalez MA, Alvarez-Alvarez I, et al. Association between consumption of ultra-processed foods and all cause mortality: SUN prospective cohort study. *BMJ*. 2019 May 29;365:11949.
- Ruanpeng D, Thongprayoon C, Cheungpasitporn W, et al. Sugar and artificially sweetened beverages linked to obesity: a systematic review and meta-analysis. *QJM*. 2017 Aug 1;110(8):513-20.
- Suez J, Korem T, Zeevi D, et al. Artificial sweeteners induce glucose intolerance by altering the gut microbiota. *Nature*. 2014 Oct 9;514(7521):181-6.
- Huang M, Quddus A, Stinson L, et al. Artificially sweetened beverages, sugar-sweetened beverages, plain water, and incident diabetes mellitus in postmenopausal women: the prospective Women's Health Initiative observational study. *Am J Clin Nutr.* 2017 Aug;106(2):614-22.
- Berrington de Gonzalez A, Hartge P, Cerhan JR, et al. Body-mass index and mortality among 1.46 million white adults. *N Engl J Med*. 2010 Dec 2;363(23):2211-9.
- Triggiani AI, Valenzano A, Ciliberti MA, et al. Heart rate variability is reduced in underweight and overweight healthy adult women. *Clin Physiol Funct Imaging*. 2017 Mar;37(2):162-7.
- 20. Electrophysiology TFotES. Heart Rate Variability. *Circulation.* 1996;93(5):1043-65.
- Neuhouser ML, Aragaki AK, Prentice RL, et al. Overweight, Obesity, and Postmenopausal Invasive Breast Cancer Risk: A Secondary Analysis of the Women's Health Initiative Randomized Clinical Trials. JAMA Oncol. 2015 Aug;1(5):611-21.
- 22. Available at: https://www.cdc.gov/healthyweight/effects/index.html. Accessed February 26, 2020.
- Available at: https://www.niddk.nih.gov/health-information/weightmanagement/health-risks-overweight. Accessed February 26, 2020.
- 24. Okifuji A, Hare BD. The association between chronic pain and obesity. *J Pain Res.* 2015;8:399-408.
- Wright LJ, Schur E, Noonan C, et al. Chronic pain, overweight, and obesity: findings from a community-based twin registry. *J Pain*. 2010 Jul;11(7):628-35.

- Wang T, He C. Pro-inflammatory cytokines: The link between obesity and osteoarthritis. Cytokine Growth Factor Rev. 2018 Dec;44: 38-50.
- Luppino FS, de Wit LM, Bouvy PF, et al. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. Arch Gen Psychiatry. 2010 Mar;67(3):220-9.
- Marchi J, Berg M, Dencker A, et al. Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. *Obes Rev.* 2015 Aug;16(8):621-38.
- Savastano S, Barrea L, Savanelli MC, et al. Low vitamin D status and obesity: Role of nutritionist. *Rev Endocr Metab Disord*. 2017 Jun;18(2):215-25.
- Estruch R, Ros E, Salas-Salvado J, et al. Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts. N Engl J Med. 2018 Jun 21;378(25):e34.
- Dinu M, Abbate R, Gensini GF, et al. Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Crit Rev Food Sci Nutr.* 2017 Nov 22;57(17):3640-9.
- 32. Berkow SE, Barnard N. Vegetarian diets and weight status. *Nutr Rev.* 2006 Apr;64(4):175-88.
- Esposito K, Kastorini CM, Panagiotakos DB, et al. Mediterranean diet and weight loss: meta-analysis of randomized controlled trials. *Metab Syndr Relat Disord*. 2011 Feb;9(1):1-12.
- Available at: https://www.mayoclinic.org/healthy-lifestyle/nutrition-andhealthy-eating/in-depth/mediterranean-diet/art-20047801. Accessed February 20, 2020.
- 35. Available at: https://oldwayspt.org/traditional-diets/mediterranean-diet. Accessed February 26, 2020.
- Ma C, Avenell A, Bolland M, et al. Effects of weight loss interventions for adults who are obese on mortality, cardiovascular disease, and cancer: systematic review and meta-analysis. *BMJ*. 2017 Nov 14;359:j4849.
- Solymar M, Ivic I, Poto L, et al. Metformin induces significant reduction of body weight, total cholesterol and LDL levels in the elderly - A metaanalysis. *PLoS One.* 2018;13(11):e0207947.
- Wang J, Ha TKQ, Shi YP, et al. Hypoglycemic triterpenes from Gynostemma pentaphyllum. *Phytochemistry*. 2018 Nov;155:171-81.
- 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.



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AMPK Metabolic Activator is a dual-nutrient formula designed to support healthy AMPK cellular activation.

References

1. Anticancer Agents Med Chem. 2013 Sep;13(7):967-70.

- 2. Nutr J. 2016;15:6.
- 3. Obesity (Silver Spring). 2014;22(1):63-71.



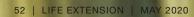
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THE Most Important Annual BLOOD TESTS

BY SCOTT FOGLE, ND

At **Life Extension**[®] we have long advocated **annual blood testing** as one of the most important ways to optimize and maintain health.

Some doctors don't order yearly blood tests or only focus on a few basics unless a patient shows symptoms of disease. This is a losing strategy. If a disease is already symptomatic, it may be too late to stop it.

But many illnesses and risk factors for disease can be detected with a blood test long before symptoms begin to show. Identifying problem areas early allows you to work with your doctor to treat and correct them—ideally, *before* they manifest in disease.

Back in 1996, **Life Extension**[®] founded the first mailorder, blood-screening service offering the public stateof-the-art **blood testing** that helps identify many of the age-related diseases **plaguing** our society today.

Dr. Scott Fogle reviews what **Life Extension**[®] considers the top, critical, yearly blood tests and the importance of annual testing.

Hidden Benefits of Blood Tests

There are many reasons experts recommend *annual blood testing*. Blood tests can:

- Detect preclinical disease. Blood tests can often reveal abnormalities long before a disease begins to show outward symptoms. Testing can detect elevated blood sugar before diabetes develops or show early warning signs of cancer. Most of these problems are far easier to treat or prevent when caught early.
- Determine changes to make. Blood testing can also identify risk factors for *future* disease and loss of function. This knowledge can then be used by you and your doctor to make healthy changes in your life, from improved diet and exercise to taking specific supplements or medication.
- Reveal causes of quality-of-life issues. Some tests can identify problems that may be impacting your general well-being. Abnormal hormone levels, for instance, can contribute to depressed mood, lack of energy, declining brain function, loss of libido, and more. Nutrients and/or medications can restore a better quality of life.
- Track responses to treatment. After identifying a problem, additional blood tests can be helpful in confirming whether changes you've made are helping. If you start taking a new medication and/or supplement, you can see if your strategy is working by tracking that blood test over time.

Experts at **Life Extension**[®] have identified some of the most important yearly blood tests for identifying preclinical disease, risk factors for future problems, and issues that affect quality of life.

1. Chemistry Panel, Complete Blood Count (CBC), and Lipid Panel

This battery of tests is often ordered together as a general screening measure, giving an overall snapshot of current health.

The **chemistry panel** includes tests of general metabolic factors, such as blood glucose (sugar) and levels of minerals and electrolytes. High glucose levels can indicate evolving metabolic disease, such as **metabolic syndrome** and **type II diabetes**, and risk for future **cardiovascular disease**.

Blood chemistry abnormalities may indicate a kidney problem, thyroid disorder, or even possible cancer. The chemistry panel also includes other tests that are excellent in screening for **kidney and liver disease**.

The **complete blood count (CBC)** identifies types and numbers of blood components, including platelets, red blood cells, and various types of white blood cells. These can help identify infection, anemia, and other blood and bone marrow conditions.

The **lipid panel** evaluates healthy and unhealthy fats in the body, which are primary drivers of your risk for **cardiovascular disease**, including heart attack and stroke.

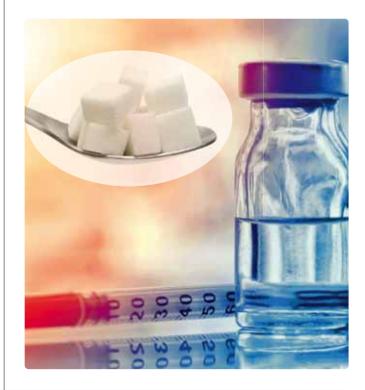
For example, high levels of LDL ("bad") cholesterol strongly contribute to the dangerous buildup of plaque in blood vessels, and to cardiovascular risk.

By identifying any abnormalities, you and your doctor can decide on an effective strategy to address them and prevent future disease.

2. Fasting Insulin

Elevated **fasting insulin** is a hidden danger. It's a major risk factor for hidden diabetes and other metabolic disease, but most people never get tested for it, so they don't know if they have it.

Insulin is a hormone that helps the body process glucose absorbed after a meal. Levels rise after a meal



but should then drop to a level just low enough to maintain optimal glucose. As your body ages and tries to compensate for poor diet, insulin can remain high even in a fasting state. High fasting insulin can be a sign of developing **insulin resistance**, a hallmark of **type II diabetes**.

Identifying high insulin levels *early* is critical.

Scientists have discovered that high insulin has harmful effects on health even *before* metabolic disease develops.^{1,2} On its own, elevated insulin can contribute to high blood pressure, atherosclerosis, obesity, cancer, abnormal blood lipids, gout, migraine, and cognitive decline.²⁻⁴

Stimulating the enzyme **AMPK** can help boost healthy metabolism, lower insulin levels, and ward off metabolic disease.^{5,6}

In addition to exercise and improved diet, some nutrients have been shown to activate AMPK, including **hesperidin**, a compound found in citrus fruits, and the herb **Gynostemma pentaphyllum**. Medications are also available to activate AMPK if needed, such as metformin.

3. Hemoglobin A1c

Abnormally high blood levels of **glucose** are a major cause of long-term health issues, from cancer to heart disease–and of course, the hallmark sign of diabetes. Practically all tissues in the body are negatively impacted by high blood sugar.

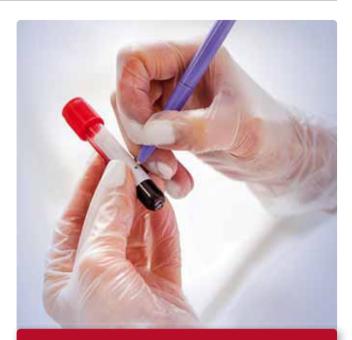
A blood glucose test, however, is only a snapshot of a moment in time. Glucose levels rise and fall throughout the day, so this test may miss a problem.

A **hemoglobin A1c** test is a superior way to screen for glucose problems because it shows what levels have looked like over the past *two to three months*. The higher the level, the more severe the problem with blood glucose control.

In addition, studies have shown that high levels of hemoglobin A1c are an important predictor of risk for **heart disease**, even in individuals who do not have metabolic syndrome or diabetes.⁷

In those *with* existing metabolic syndrome or diabetes, hemoglobin A1c can be used to track response to treatment, confirming that blood glucose control is improving.

Dietary changes, exercise, nutrients (including **magnesium** and **vitamin D**),^{8,9} and medications can help bring elevated hemoglobin A1c and blood sugar under control.



WHAT YOU NEED TO KNOW

The Benefits of Blood Tests

- Many diseases only reveal themselves when symptoms begin to show. By that point it may be too late to effectively treat them.
- Simple annual blood tests can detect signs and risk factors for disease early on, giving you and your doctor the knowledge to enact a plan to achieve and maintain optimal health.
- Scientists at Life Extension[®] have identified some of the most important yearly blood tests. They screen for common diseases, risk factors for future health problems, and issues that diminish quality of life.
- The recommended tests include the chemistry panel/complete blood count/ lipid panel, fasting insulin, hemoglobin A1c, DHEA, prostate-specific antigen, homocysteine, C-reactive protein, thyroid stimulating hormone, testosterone (free and total), estradiol/progesterone, apolipoprotein B100, magnesium, and vitamin D.



4. DHEA

DHEA (dehydroepiandrosterone) is a hormone produced naturally in the adrenal glands. The body uses it to make other hormones, including the male and female sex hormones, **testosterone** and **estrogen**.

Levels of DHEA peak in the 20s, then steadily decline. This slow slide can compromise vitality and quality of life in older age to such a degree that DHEA is sometimes referred to as an **"anti-aging" hormone**.¹⁰

If a blood test shows low levels, DHEA can be taken orally to support healthy levels. It can also help support testosterone and estrogen levels to varying degrees.

DHEA itself also supports immune function, bone density, mood, libido, and healthy body composition.¹⁰

A **2017** study published in the *Journal of the American Heart Association* found that lower DHEA levels indicated a significant increased risk for allcause mortality, fatal cardiovascular event, and nonfatal cardiovascular event in patients with cardiovascular disease.¹¹

A **2019** study concluded that higher levels of DHEA are associated with a lower risk of falls and recurrent falls in older people, especially women.¹² In addition, a **2018** meta-analysis on DHEA for depression pointed to a significant effect in favor of treatment with DHEA compared to placebo.¹³

5. Prostate-Specific Antigen (PSA) for Men

Prostate-specific antigen (**PSA**) is a protein made in the **prostate gland** of the male reproductive system.

Normally, PSA largely remains in the prostate. But several conditions cause it to be released into the bloodstream, where it is detectable on a simple blood test. These include age-related enlargement of the prostate, inflammation, infection, and **prostate cancer**.

Prostate cancer is extremely common in men and often causes no outward symptoms early in its development. Regular **PSA screenings** can identify it early, when it is still confined to the prostate gland and easiest to treat.

The *American Cancer Society* recommends **annual testing** for men beginning at **50**, and at **40-45** in those deemed high risk, including men with a strong family history of prostate cancer.¹⁴

If an elevated PSA level is detected, further testing should be done under the direction of your physician.

6. Homocysteine

Studies have linked high levels of the amino acid **homocysteine** with increased risk for several health problems, including heart attack, bone fractures, macular degeneration, gallstones, and declining cognitive function.¹⁵⁻¹⁹

In fact, even in people with no history of cardiovascular disease, those with the highest homocysteine levels had more than a **3-fold increased risk of heart attack** over a five-year period, compared to those with the lowest levels.²⁰

High levels of homocysteine can be lowered by increasing intake of the B vitamins folate, B2, B6, and B12. Supplementation with active forms pyridoxal-5-phosphate (B6), methylcobalamin (B12), and **5-MTHF** (folic acid) provides the exact form of these vitamins that your body can use best.

7. C-Reactive Protein

Chronic inflammation is a major contributor to *nearly all* forms of age-related disease and dysfunction, including diabetes, cardiovascular disease, Alzheimer's, cancer, and more.²¹

We now know that chronic inflammation *accelerates the aging process itself*, leading scientists to coin the term *inflammaging* to describe the connection.²²

C-reactive protein (CRP) level in the blood is one of the most used clinical indicators of inflammation throughout the body.

The most recent technology in C-reactive protein testing is a test called **Cardiac CRP** (or High Sensitivity CRP). This is a highly sensitive test, able to detect even small changes in C-reactive protein levels. Despite its name, it indicates levels of inflammation throughout the entire body.

Elevated levels of C-reactive protein are predictive of cardiovascular disease, type II diabetes, age-related macular degeneration, cognitive decline, and more.²³⁻²⁶

Many nutrients can *reduce* inflammation, including **omega-3 fatty acids** from fish oil, **curcumin** (a compound found in turmeric), **magnesium** and **zinc**, **vita-min D**, and various **polyphenols** including **flavonoids**.²⁷

8. Thyroid Stimulating Hormone

The **thyroid** gland in the neck secretes thyroid hormone. It can be thought of as a master regulator that sets the base level of metabolism in the body.

Several disorders can lead to either **hyperthyroidism** (excess levels of thyroid hormone) or **hypothyroidism** (*low* levels).

Hyperthyroidism can cause rapid or irregular heartbeat, anxiety, irritability, tremors, and difficulty sleeping.²⁸

Hypothyroidism, which is more common in women, can cause unexplained fatigue, depression or anxiety, constipation, dry skin, low libido, and weight gain.²⁹

Thyroid stimulating hormone is produced in the pituitary gland and exerts control over the secretion of thyroid hormone. If there is something wrong with thyroid function, levels of thyroid stimulating hormone are usually disturbed. This shows up on a blood test, helping to identify various thyroid problems.

Both hyperthyroidism and hypothyroidism can be treated with medications and several nutrients can support healthy thyroid function like selenium, vitamins A and B12, iodine, magnesium, ashwagandha root extract, L-tyrosine, and fermented Korean ginseng root extract.^{30,31}

9. Testosterone (Free and Total)

Testosterone is the primary sex hormone in men, while healthy women produce smaller amounts. It is mostly made by the testes, but the ovaries in women and the adrenal glands in both genders also make small amounts of testosterone.

Levels fall with advancing age, which has a significant impact on health.

In <u>men</u>, testosterone drops to about **60%** of their youthful levels by age 75.³² These lower levels contribute to diminished libido, erectile dysfunction, loss of muscle mass and strength, increased body fat, lower bone density, depressed mood, and trouble concentrating.³³⁻³⁵

Low testosterone is also linked to an increased risk of life-threatening conditions such as cardiovascular disease, type II diabetes, and metabolic syndrome.³⁶⁻³⁸





Levels of testosterone in <u>women</u> also drop with age and significantly impact quality of life. As in men, maintaining adequate levels helps to prevent loss of libido, depressed mood, loss of muscle, and more.

Testing can reveal levels of **free testosterone** (testosterone that is not bound to any other proteins) and **total testosterone** (all testosterone, free *and* bound, in the blood). The most comprehensive test measures both.

Your physician can discuss various treatments for low testosterone levels.

10. Estradiol and Progesterone

In women, the ovaries produce two primary sex hormones, **estrogen** (which mainly circulates in a form called **estradiol**) and **progesterone**. Men also produce small amounts of these hormones.

Both hormones are involved in fertility and reproductive function. But like testosterone, they have diverse effects on other aspects of health in men and women.

Testing estradiol and progesterone in women during reproductive years can help evaluate **fertility** and identify possible reasons for difficulty conceiving or maintaining a healthy pregnancy.

In women *after* menopause and in older men, these hormones support healthy bone mineral density. In fact, lower levels of estradiol are directly associated with increased risk of **osteoporosis** and **bone fractures**.³⁹⁻⁴²

Some health conditions can also cause unnaturally *high* levels of these hormones, such as ovarian cysts and rare forms of **ovarian cancer**. Screening for these hormones can both help maximize bone health and catch signs of disease that would have otherwise gone undetected.

As a woman ages and starts moving toward menopause, the first hormone that typically drops is **progesterone**.

During a typical 28-day menstrual cycle progesterone peaks around day 21. This is the best day to test progesterone for a woman still having cycles but feeling that her hormones may be off or diminishing. Blood testing can help identify the ideal dose of bioidentical progesterone for sleep, libido, depression, mood changes, anxiety, a racing mind, and hot flashes.

11. Apolipoprotein B100

Apolipoprotein B100 (Apo B) is a component of low-density lipoprotein (LDL) cholesterol and very lowdensity lipoprotein (VLDL) cholesterol. It is present in all the lipoprotein particles that are not HDL.

Non-HDL particles are known as "bad" cholesterol because higher levels contribute to the development of **atherosclerosis**, the buildup of plaque on artery walls. Atherosclerosis leads to **cardiovascular disease** and raises risk of heart attack and stroke. Although cholesterol levels by themselves are an indicator of risk for cardiovascular disease, research shows that **apolipoprotein B100** is an even *better* predictor of heart disease and other cardiovascular conditions.⁴³⁻⁴⁶

The higher the number of the Apo B blood test, the greater the risk for future cardiovascular disease.

12. Vitamin D

For decades, science has recognized the importance of **vitamin D** for the health of bones. Lower levels put people at risk for **osteoporosis** and **bone fractures**.

In recent years, research has found that vitamin D is far more important to many different aspects of health than was previously understood. Low levels have now been found to be associated with increased risk for cardiovascular disease, autoimmune diseases, neurological disorders, diabetes, depression, and cancer.^{47,48}

Vitamin D is also tied to overall **longevity**: Those with the highest levels generally lead longer, healthier lives.⁴⁹

Most people do not get enough vitamin D. More than **40%** of Americans have insufficient blood levels of vitamin D (defined as less than **30 mg/dL**) in this study,⁵⁰ however Life Extension advocates an optimal level of **50** to **80 ng/mL**.

Low levels of vitamin D do not cause any symptoms until diseases begin to arise, so testing is critical. Correcting a deficiency is as simple as taking regular doses of vitamin D to raise levels into the optimal range.

13. Magnesium

Most Americans aren't getting nearly enough **magnesium**.

By recent estimates, roughly **64%** of all men and **67%** of all women in the U.S. have inadequate intake of magnesium.⁵¹ For those over 71, who have diminished ability to absorb the mineral, that number rises to more than **80%**.

Suboptimal intake of magnesium can lead to **magnesium deficiency**.

<u>Severe</u> magnesium deficiency leads to nausea, vomiting, fatigue, and weakness.

But even <u>mild</u> deficiency is thought to eventually contribute to life-threatening disease.

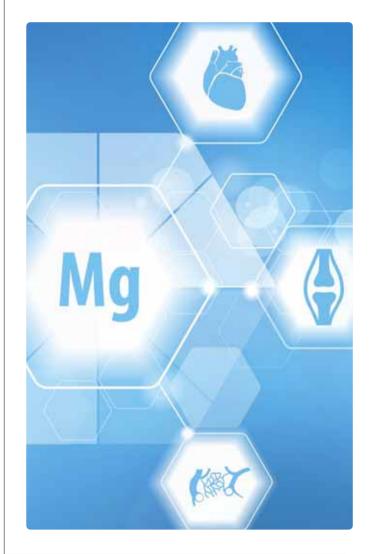
Magnesium deficiency is linked to high blood pressure, arterial stiffening, dysfunction of the blood vessels, and atherosclerosis, all of which lead to **cardiovascular disease**.⁵²

Indeed, human studies have found that *lower* levels of magnesium are significantly associated with *higher* rates of **heart attack** and **stroke**.⁵¹⁻⁵³

Low magnesium is also a major contributor to other chronic illnesses, including type II diabetes, osteo-porosis, and cognitive decline and dementia.⁵⁴⁻⁵⁹

Fortunately, simple **blood tests** can identify low magnesium levels. Experts in magnesium research concluded that the regular lab reference range for serum magnesium is not adequate for maintaining health. They determined a person should be in approximately the upper half of the reference range for good health. At the lower end of the reference range their research indicated magnesium was being pulled from the bones and other tissues.⁶⁰

Annual testing of magnesium can indicate the need for magnesium supplementation and determines whether increased intake is bringing levels into an optimal range.



Summary

Many disorders and risk factors for disease are hidden. They don't present any outward symptoms in their early stages.

Annual **blood testing** can reveal these problems, years or even decades before disease would occur.

Once identified, problem areas can be discussed with a doctor and addressed through various interventions, including dietary changes, exercise, nutrients, and, when necessary, medication.

THE MOST IMPORTANT YEARLY TESTS ARE:

- Chemistry panel/complete blood count/lipid panel,
- Fasting insulin,
- Hemoglobin A1c,
- DHEA,
- Prostate-specific antigen (for men),
- Homocysteine,
- · C-reactive protein,
- Thyroid stimulating hormone,
- Testosterone (free and total),
- Estradiol/progesterone,
- Magnesium,
- Apolipoprotein B100, and
- Vitamin D.

Having these blood tests done *annually* lets you make informed decisions to optimize current health and reduce risk for future 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

- Crofts C, Schofield G, Zinn C, et al. Identifying hyperinsulinaemia in the absence of impaired glucose tolerance: An examination of the Kraft database. *Diabetes Res Clin Pract.* 2016 Aug;118:50-7.
- Erion KA, Corkey BE. Hyperinsulinemia: a Cause of Obesity? Curr Obes Rep. 2017 Jun;6(2):178-86.
- Modan M, Halkin H, Almog S, et al. Hyperinsulinemia. A link between hypertension obesity and glucose intolerance. *J Clin Invest.* 1985 Mar;75(3):809-17.
- 4. Kahn BB, Flier JS. Obesity and insulin resistance. *J Clin Invest.* 2000 Aug;106(4):473-81.
- 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.
- Towler MC, Hardie DG. AMP-activated protein kinase in metabolic control and insulin signaling. *Circ Res.* 2007 Feb 16;100(3):328-41.
- Goto A, Noda M, Matsushita Y, et al. Hemoglobin a1c levels and the risk of cardiovascular disease in people without known diabetes: a population-based cohort study in Japan. *Medicine (Baltimore).* 2015 May;94(17):e785.
- Mohamad MI, El-Sherbeny EE, Bekhet MM. The Effect of Vitamin D Supplementation on Glycemic Control and Lipid Profile in Patients with Type 2 Diabetes Mellitus. J Am Coll Nutr. 2016 Jul;35(5):399-404.
- 9. Labban L, Thallaj N. The Effect of Magnesium Supplementation on Hba1c Level and Lipid Profile Among Type 2 Diabetics. *Acta Scientifci Nutritional Health.* 2019 09/04;3(10):07-12.
- Rutkowski K, Sowa P, Rutkowska-Talipska J, et al. Dehydroepiandrosterone (DHEA): hypes and hopes. *Drugs*. 2014 Jul;74(11):1195-207.
- Wu TT, Chen Y, Zhou Y, et al. Prognostic Value of Dehydroepiandrosterone Sulfate for Patients With Cardiovascular Disease: A Systematic Review and Meta-Analysis. J Am Heart Assoc. 2017 May 5;6(5).
- 12. Carrer P, Trevisan C, Franchin A, et al. Dehydroepiandrosterone sulfate and fall risk in older people: Sex differences in the Pro.V.A. longitudinal study. *Maturitas*. 2019 Oct;128:43-8.



- Peixoto C, Grande AJ, Mallmann MB, et al. Dehydroepiandrosterone (DHEA) for Depression: A Systematic Review and Meta-Analysis. *CNS Neurol Disord Drug Targets*. 2018;17(9):706-11.
- Available at: https://www.cancer.org/cancer/prostate-cancer/earlydetection/acs-recommendations.html. Accessed February 13, 2020.
- Rallidis LS, Kosmas N, Rallidi T, et al. Homocysteine is an independent predictor of long-term cardiac mortality in patients with stable coronary artery disease in the era of statins. *Coron Artery Dis.* 2020 Mar;31(2):152-6.
- Fratoni V, Brandi ML. B vitamins, homocysteine and bone health. Nutrients. 2015 Mar 30;7(4):2176-92.
- 17. Smith AD, Refsum H. Homocysteine, B Vitamins, and Cognitive Impairment. *Annu Rev Nutr.* 2016 Jul 17;36:211-39.
- Huang P, Wang F, Sah BK, et al. Homocysteine and the risk of agerelated macular degeneration: a systematic review and meta-analysis. Sci Rep. 2015 Jul 21;5:10585.
- Sakuta H, Suzuki T. Plasma total homocysteine and gallstone in middle-aged Japanese men. J Gastroenterol. 2005 Nov;40(11):1061-4.
- Stampfer MJ, Malinow MR, Willett WC, et al. A prospective study of plasma homocyst(e)ine and risk of myocardial infarction in US physicians. *JAMA*. 1992 Aug 19;268(7):877-81.
- 21. Gupta SC, Kunnumakkara AB, Aggarwal S, et al. Inflammation, a Double-Edge Sword for Cancer and Other Age-Related Diseases. *Front Immunol.* 2018;9:2160.
- 22. Sanada F, Taniyama Y, Muratsu J, et al. Source of Chronic Inflammation in Aging. *Front Cardiovasc Med.* 2018;5:12.
- 23. Koenig W, Sund M, Frohlich M, et al. C-Reactive protein, a sensitive marker of inflammation, predicts future risk of coronary heart disease in initially healthy middle-aged men: results from the MONICA (Monitoring Trends and Determinants in Cardiovascular Disease) Augsburg Cohort Study, 1984 to 1992. *Circulation.* 1999 Jan 19;99(2):237-42.
- 24. Pradhan AD, Manson JE, Rifai N, et al. C-reactive protein, interleukin 6, and risk of developing type 2 diabetes mellitus. *JAMA*. 2001 Jul 18;286(3):327-34.
- 25. Seddon JM, George S, Rosner B, et al. Progression of age-related macular degeneration: prospective assessment of C-reactive protein, interleukin 6, and other cardiovascular biomarkers. *Arch Ophthalmol.* 2005 Jun;123(6):774-82.
- Teunissen CE, van Boxtel MP, Bosma H, et al. Inflammation markers in relation to cognition in a healthy aging population. *J Neuroimmunol.* 2003 Jan;134(1-2):142-50.
- 27. Available at: https://www.lifeextension.com/protocols/health-concerns/chronic-inflammation. Accessed February 13, 2020.
- Available at: https://www.mayoclinic.org/diseases-conditions/hyperthyroidism/symptoms-causes/syc-20373659. Accessed February 13, 2020.
- Available at: https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284. Accessed February 13, 2020.
- 30. Available at: https://www.lifeextension.com/protocols/metabolichealth/hypothyroidism#. Accessed February 13, 2020.
- Available at: https://www.lifeextension.com/protocols/metabolichealth/hyperthyroidism#. Accessed February 13, 2020.
- 32. Leifke E, Gorenoi V, Wichers C, et al. Age-related changes of serum sex hormones, insulin-like growth factor-1 and sex-hormone binding globulin levels in men: cross-sectional data from a healthy male cohort. *Clin Endocrinol (Oxf).* 2000 Dec;53(6):689-95.
- Available at: https://my.clevelandclinic.org/health/diseases/15603low-testosterone-male-hypogonadism. Accessed February 19, 2020.
- 34. Available at: https://medlineplus.gov/ency/patientinstructions/000722.htm. Accessed February 19, 2020.
- Available at: https://www.urologyhealth.org/urologic-conditions/lowtestosterone. Accessed February 19, 2020.
- Kloner RA, Carson C, 3rd, Dobs A, et al. Testosterone and Cardiovascular Disease. J Am Coll Cardiol. 2016 Feb 9;67(5):545-57.
- Fink J, Matsumoto M, Tamura Y. Potential application of testosterone replacement therapy as treatment for obesity and type 2 diabetes in men. *Steroids.* 2018 Oct;138:161-6.
- Fernandez-Miro M, Chillaron JJ, Pedro-Botet J. [Testosterone deficiency, metabolic syndrome and diabetes mellitus]. *Med Clin (Barc)*. 2016 Jan 15;146(2):69-73.

- 39. Khosla S, Riggs BL, Robb RA, et al. Relationship of volumetric bone density and structural parameters at different skeletal sites to sex steroid levels in women. *J Clin Endocrinol Metab.* 2005 Sep;90(9):5096-103.
- 40. Amin S, Zhang Y, Sawin CT, et al. Association of hypogonadism and estradiol levels with bone mineral density in elderly men from the Framingham study. *Ann Intern Med.* 2000 Dec 19;133(12):951-63.
- 41. Szulc P, Uusi-Rasi K, Claustrat B, et al. Role of sex steroids in the regulation of bone morphology in men. The MINOS study. *Osteoporos Int.* 2004 Nov;15(11):909-17.
- 42. Khosla S, Pacifici R. Estrogen Deficiency, Postmenopausal Osteoporosis, and Age-Related Bone Loss. In: Marcus R, Feldman D, Dempster DW, Luckey M, Cauley JA, editors. *Osteoporosis*. San Diego: Academic Press; 2013:1113-36.
- 43. Lamarche B, Moorjani S, Lupien PJ, et al. Apolipoprotein A-I and B levels and the risk of ischemic heart disease during a five-year follow-up of men in the Quebec cardiovascular study. *Circulation*. 1996 Aug 1;94(3):273-8.
- 44. Walldius G, Jungner I, Aastveit AH, et al. The apoB/apoA-I ratio is better than the cholesterol ratios to estimate the balance between plasma proatherogenic and antiatherogenic lipoproteins and to predict coronary risk. *Clin Chem Lab Med.* 2004;42(12):1355-63.
- 45. Benn M, Nordestgaard BG, Jensen GB, et al. Improving prediction of ischemic cardiovascular disease in the general population using apolipoprotein B: the Copenhagen City Heart Study. *Arterioscler Thromb Vasc Biol.* 2007 Mar;27(3):661-70.
- 46. Pitts R, Bhatt K, Varghese V, et al. Apolipoprotein B predicts risk for acute coronary syndrome in patients with metabolic syndrome. *European Heart Journal.* 2013;34(suppl 1):P3097-P.
- 47. Meehan M, Penckofer S. The Role of Vitamin D in the Aging Adult. J Aging Gerontol. 2014 Dec;2(2):60-71.
- Umar M, Sastry KS, Chouchane AI. Role of Vitamin D Beyond the Skeletal Function: A Review of the Molecular and Clinical Studies. *Int J Mol Sci.* 2018 May 30;19(6).
- Pareja-Galeano H, Alis R, Sanchis-Gomar F, et al. Vitamin D, precocious acute myocardial infarction, and exceptional longevity. Int J Cardiol. 2015 Nov 15;199:405-6.
- 50. Liu X, Baylin A, Levy PD. Vitamin D deficiency and insufficiency among US adults: prevalence, predictors and clinical implications. *Br J Nutr.* 2018 Apr;119(8):928-36.
- 51. Qu X, Jin F, Hao Y, et al. Magnesium and the risk of cardiovascular events: a meta-analysis of prospective cohort studies. *PLoS One.* 2013;8(3):e57720.
- 52. Kostov K, Halacheva L. Role of Magnesium Deficiency in Promoting Atherosclerosis, Endothelial Dysfunction, and Arterial Stiffening as Risk Factors for Hypertension. *Int J Mol Sci.* 2018 Jun 11;19(6).
- 53. DiNicolantonio JJ, O'Keefe JH, Wilson W. Subclinical magnesium deficiency: a principal driver of cardiovascular disease and a public health crisis. *Open Heart.* 2018;5(1):e000668.
- 54. Barbagallo M, Dominguez LJ. Magnesium metabolism in type 2 diabetes mellitus, metabolic syndrome and insulin resistance. *Arch Biochem Biophys.* 2007 Feb 1;458(1):40-7.
- 55. Billard JM. Brain free magnesium homeostasis as a target for reducing cognitive aging. In: Vink R, Nechifor M, editors. *Magnesium in the Central Nervous System*. Adelaide (AU)2011.
- 56. Chaudhary DP, Sharma R, Bansal DD. Implications of magnesium deficiency in type 2 diabetes: a review. *Biol Trace Elem Res.* 2010 May;134(2):119-29.
- 57. Geiger H, Wanner C. Magnesium in disease. *Clin Kidney J.* 2012 Feb;5(Suppl 1):i25-i38.
- 58. Vink R. Magnesium in the CNS: recent advances and developments. *Magnes Res.* 2016 Mar 1;29(3):95-101.
- 59. Barbagallo M, Dominguez LJ. Magnesium and the cardiometabolic syndrome. *Curr Nutr Rep.* 2012;1(2):100-8.
- 60. Costello RB, Elin RJ, Rosanoff A, et al. Perspective: The Case for an Evidence-Based Reference Interval for Serum Magnesium: The Time Has Come. *Adv Nutr.* 2016 Nov;7(6):977-93.



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1

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- 1. Nutraveris. 2006; unpublished study.
- 2. Nutr Res. 2010 May;30(5):305-13.

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BY JANICE HAMILTON

A nutrient called **PQQ (pyrroloquinoline quinone)** restores youthful cellular function and extends the lifespan of worms.^{1,2}

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A team of researchers from China and Italy found that when PQQ was applied to **human** cells in culture, it **delayed cellular senescence**.¹⁰

A growing body of research suggests that reducing cellular senescence may lead to *increased health-span and lifespan*.

This one-two punch—promoting **mitochondrial health** and slowing cellular senescence—explains why PQQ has powerful potential to slow aging processes.

In fact, in those recent worm studies, PQQ increased **lifespan by roughly 30%**.^{1,2}

Stopping Cellular Senescence

Low-level chronic inflammation is a key contributor to aging of the human body.

As we age, levels of inflammation-stoking messenger molecules called **cytokines** *increase*, contributing to greater risk of cardiovascular disease, neurodegenerative diseases, diabetes, cancer, and more.

This phenomenon, known as *inflammaging*, is a major factor in the aging process itself.^{11,12}

In a preclinical cell study, the nutrient **PQQ (pyrroloquinoline quinone)** showed the ability to block the effects of these harmful molecules by interfering with the *signaling* pathways they provoke to induce cellular senescence and inflammaging.¹⁰

Testing PQQ in Human Cells

A team of scientists recently set out to determine whether PQQ could *slow cell aging* caused by inflammatory signaling, and reduce the number of senescent cells.¹⁰

Researchers first grew **human lung cells** in a nutrient broth, and added inflammaging-associated proteins, including TNF-alpha, to some of the cell samples.¹⁰

TNF-alpha promoted senescence and inflammaging in the treated cells. But when cells were **pre-treated with PQQ** before the TNF-alpha, the numbers of senescent cells in the culture dropped to significantly less than those in the untreated group. Other signs of inflammaging were also reduced in PQQ-treated cells.

This study shows that PQQ can **inhibit cellular aging** by reducing TNF-alpha's ability to stimulate senescence. This is a promising finding for PQQ's ability to slow aging throughout the body and help prevent age-related disease.

Protecting the Heart

In energy-consuming cells like those in the **heart**, PQQ functions almost like a "fuel additive", helping to burn fuel more efficiently.

In animals suffering heart attacks, <u>insufficient</u> PQQ contributes to worse outcomes.¹³

Animal studies show that *increasing* PQQ in models of heart attack can:¹⁴⁻¹⁷

- Shrink the size of the **infarct**, or damaged area, in the heart muscle,
- Improve cardiac function following loss of blood flow (**ischemia**) to the heart muscle,
- Boost the function of mitochondria in ailing heart cells subjected to ischemia, and
- Prevent heart muscle death after ischemia.

These benefits are likely attributable to PQQ's ability to combat oxidative stress *and* its effects on signaling pathways.^{17,18}





Benefits for Diabetes

PQQ was shown in a cell culture study to block oxidative stress and cell death caused by high glucose, through an effect on signaling pathways.¹⁹

By battling oxidative stress and modulating insulin signaling pathways, PQQ has been shown in diabetic animals and in lab studies to:¹⁹⁻²³

- Lower blood sugar,
- Decrease lipid abnormalities,
- Activate insulin signaling to increase glucose tolerance,
- Reduce glucose-induced oxidative stress in brain tissue, a contributor to neurodegenerative diseases, and
- Protect kidney cells against events leading to diabetic kidney disease.

PQQ also increases production of the "longevity protein" **Sirt3**, a longevity-associated factor that supports healthy mitochondrial function.^{24,25}

WHAT YOU NEED TO KNOW

Fight Aging with PQQ

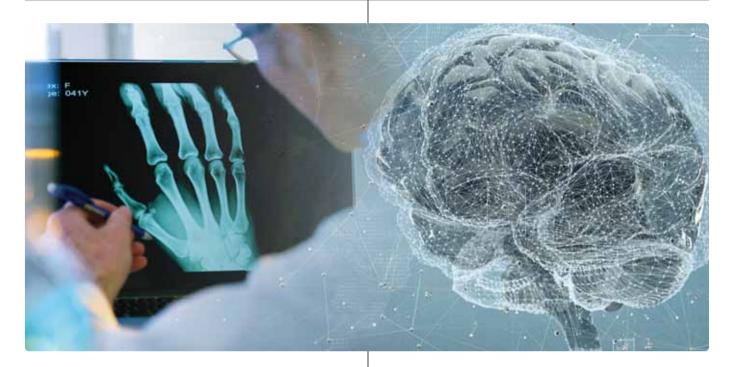
- Damaged, aging cells called senescent cells give off age-promoting signaling molecules.
- These harmful molecular signals promote inflammation and are a major driver of aging and age-related disease.
- PQQ (pyrroloquinoline quinone) is a vitamin-like nutrient that is known for its ability to protect the mitochondria and promote the formation of new mitochondria.
- A new cell-based study shows that PQQ can also reduce senescent cells and block the harmful signals they give off.
- PQQ may also slow the overall aging process itself, and has been shown to extend lifespan by 30% in animal studies.

Building Stronger Bones

In *aging* bone, **senescent cells** accumulate, pouring out damaging pro-inflammatory signaling molecules.²⁶ This is yet another mechanism involved in the destructive effects of **inflammaging**.

Over time, **inflammaging** contributes to *lower* rates of new bone formation and *higher* rates of bone breakdown. The result: **weaker, fracture-prone bones**.²⁷

Animal studies have shown that PQQ can promote bone formation and prevent bone degradation. It accomplishes this through multiple, different pathways, including oxidative stress, hormonal, and complex signaling pathways.²⁸⁻³²



In these studies, PQQ's effects included the ability to:

- Strengthen and thicken healthy bone,
- Rescue weakening bone from further breakdown,
- Inhibit inflammatory secretions from senescent cells,
- Prevent bone loss related to low levels of estrogen (like that seen in menopause) and testosterone,
- Stimulate new bone formation,
- Slow the development of bone-depleting osteoclasts, and
- Promote formation of bone-producing osteoblasts.

Help for the Aging Brain

The **brain** consumes more energy than any other organ in the body.

That makes brain tissue especially vulnerable to disruptions in its energy supply.

In fact, aging mitochondria are known to contribute to many age-related brain disorders, including **Alzheimer's** and **Parkinson's disease**.^{33,34} By helping mitochondria perform more efficiently and by promoting the development of *new* mitochondria, PQQ may help prevent these diseases.^{23,35,36}

Studies in rats show that increasing PQQ can *minimize brain injury* induced by rotenone, a neurotoxin that causes Parkinson's-like symptoms.³⁶ Rats receiving rotenone and then being treated with PQQ suffer less loss of brain cells and perform better on lab tests afterward compared with untreated animals.

PQQ also protects brain cells against **excitotoxicity**, which is believed to be one cause of Alzheimer's disease.³⁷ Excitotoxicity occurs when nerve cells are damaged or killed by overactivity of the neurotransmitter **glutamate**.³⁸

In a cell culture study, PQQ countered glutamate's destructive effects by stimulating growth of neural stem cells and reducing damage to brain cells.³⁹

Extending Lifespan

When **senescent** cells accumulate, it accelerates aging processes.¹² By reducing the number of senescent cells, PQQ may **increase lifespan**.

Two different research groups evaluated PQQ's lifeextending effects on a type of roundworm, *C. elegans*, which is commonly used to study longevity.

The findings were nearly identical. In one study, giving the animals **PQQ** <u>increased</u> **lifespan by an average** of **30%.** In the other study, the animal models lived an average of **31%** longer.^{1,2}

Summary

PQQ (pyrroloquinoline quinone) is a compound that protects **mitochondria**, the "powerhouses" of our cells.

It promotes the formation of new, healthy mitochondria. This has anti-aging benefits throughout the body.

Recent studies have shown a way that PQQ may be able to slow aging even *more*, by reducing the activity of certain age-accelerating **signaling pathways**.

This can help lower chronic inflammation and agingpromoting **senescent cells**.

By slowing cellular aging, PQQ can help lower risks of cardiovascular disease, diabetes, osteoporosis, and neurodegenerative disorders.

Since PQQ has effects on so many aging pathways, it is a prime candidate for targeting the aging process itself and extending healthy lifespan. •

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

- Sasakura H, Moribe H, Nakano M, et al. Lifespan extension by peroxidase and dual oxidase-mediated ROS signaling through pyrroloquinoline quinone in C. elegans. *J Cell Sci.* 2017 Aug 1;130(15):2631-43.
- Wu JZ, Huang JH, Khanabdali R, et al. Pyrroloquinoline quinone enhances the resistance to oxidative stress and extends lifespan upon DAF-16 and SKN-1 activities in C. elegans. *Exp Gerontol.* 2016 Jul;80:43-50.
- Hwang P, Willoughby DS. Mechanisms Behind Pyrroloquinoline Quinone Supplementation on Skeletal Muscle Mitochondrial Biogenesis: Possible Synergistic Effects with Exercise. J Am Coll Nutr. 2018 May 1:1-11.
- Lu J, Chen S, Shen M, et al. Mitochondrial regulation by pyrroloquinoline quinone prevents rotenone-induced neurotoxicity in Parkinson's disease models. *Neurosci Lett.* 2018 Nov 20;687:104-10.
- Martino Adami PV, Quijano C, Magnani N, et al. Synaptosomal bioenergetic defects are associated with cognitive impairment in a transgenic rat model of early Alzheimer's disease. J Cereb Blood Flow Metab. 2017 Jan;37(1):69-84.
- Ng CH, Basil AH, Hang L, et al. Genetic or pharmacological activation of the Drosophila PGC-1alpha ortholog spargel rescues the disease phenotypes of genetic models of Parkinson's disease. *Neurobiol Aging.* 2017 Jul;55:33-7.
- Saihara K, Kamikubo R, Ikemoto K, et al. Pyrroloquinoline Quinone, a Redox-Active o-Quinone, Stimulates Mitochondrial Biogenesis by Activating the SIRT1/PGC-1alpha Signaling Pathway. *Biochemistry*. 2017 Dec 19;56(50):6615-25.
- Singh AK, Pandey SK, Saha G, et al. Pyrroloquinoline quinone (PQQ) producing Escherichia coli Nissle 1917 (EcN) alleviates age associated oxidative stress and hyperlipidemia, and improves mitochondrial function in ageing rats. *Exp Gerontol.* 2015 Jun;66:1-9.
- 9. Zhang J, Meruvu S, Bedi YS, et al. Pyrroloquinoline quinone increases the expression and activity of Sirt1 and -3 genes in HepG2 cells. *Nutr Res.* 2015 Sep;35(9):844-9.



- Hao J, Ni X, Giunta S, et al. Pyrroloquinoline quinone delays inflammaging induced by TNF-alpha through the p16/p21 and Jagged1 signalling pathways. *Clin Exp Pharmacol Physiol.* 2020 Jan;47(1):102-10.
- Available at: https://www.nia.nih.gov/about/living-long-well-21stcentury-strategic-directions-research-aging/inflammation-plays. Accessed March 4, 2020.
- Rea IM, Gibson DS, McGilligan V, et al. Age and Age-Related Diseases: Role of Inflammation Triggers and Cytokines. *Front Immunol.* 2018 2018-April-09;9(586):586.
- Bauerly K, Harris C, Chowanadisai W, et al. Altering pyrroloquinoline quinone nutritional status modulates mitochondrial, lipid, and energy metabolism in rats. *PLoS One.* 2011;6(7):e21779.
- 14. Zhu BQ, Zhou HZ, Teerlink JR, et al. Pyrroloquinoline quinone (PQQ) decreases myocardial infarct size and improves cardiac function in rat models of ischemia and ischemia/reperfusion. *Cardiovasc Drugs Ther.* 2004 Nov;18(6):421-31.
- 15. Zhu BQ, Simonis U, Cecchini G, et al. Comparison of pyrroloquinoline quinone and/or metoprolol on myocardial infarct size and mitochondrial damage in a rat model of ischemia/reperfusion injury. *J Cardiovasc Pharmacol Ther.* 2006 Jun;11(2):119-28.
- Tao R, Karliner JS, Simonis U, et al. Pyrroloquinoline quinone preserves mitochondrial function and prevents oxidative injury in adult rat cardiac myocytes. *Biochem Biophys Res Commun.* 2007 Nov 16;363(2):257-62.
- Xu F, Yu H, Liu J, et al. Pyrroloquinoline quinone inhibits oxygen/ glucose deprivation-induced apoptosis by activating the PI3K/AKT pathway in cardiomyocytes. *Mol Cell Biochem.* 2014 Jan;386(1-2):107-15.
- Ames BN. Prolonging healthy aging: Longevity vitamins and proteins. Proc Natl Acad Sci U S A. 2018 Oct 23;115(43):10836-44.
- Wang Z, Li Y, Wang Y, et al. Pyrroloquinoline quinine protects HK-2cells against high glucose-induced oxidative stress and apoptosis through Sirt3 and PI3K/Akt/FoxO3a signaling pathway. *Biochem Biophys Res Commun.* 2019 Jan 8;508(2):398-404.
- 20. Takada M, Sumi M, Maeda A, et al. Pyrroloquinoline quinone, a novel protein tyrosine phosphatase 1B inhibitor, activates insulin signaling in C2C12 myotubes and improves impaired glucose tolerance in diabetic KK-A(y) mice. *Biochem Biophys Res Commun.* 2012 Nov 16;428(2):315-20.
- Kumar N, Kar A. Pyrroloquinoline quinone (PQQ) has potential to ameliorate streptozotocin-induced diabetes mellitus and oxidative stress in mice: A histopathological and biochemical study. *Chem Biol Interact.* 2015 Oct 5;240:278-90.
- 22. Kumar N, Kar A. Pyrroloquinoline quinone ameliorates oxidative stress and lipid peroxidation in the brain of streptozotocin-induced diabetic mice. *Can J Physiol Pharmacol.* 2015 Jan;93(1):71-9.
- Wang Z, Chen GQ, Yu GP, et al. Pyrroloquinoline quinone protects mouse brain endothelial cells from high glucose-induced damage in vitro. Acta Pharmacol Sin. 2014 Nov;35(11):1402-10.
- 24. Gomes P, Viana SD, Nunes S, et al. The yin and yang faces of the mitochondrial deacetylase sirtuin 3 in age-related disorders. *Ageing Res Rev.* 2020 Jan;57:100983.
- Benigni A, Perico L, Macconi D. Mitochondrial Dynamics Is Linked to Longevity and Protects from End-Organ Injury: The Emerging Role of Sirtuin 3. Antioxid Redox Signal. 2016 Aug 1;25(4):185-99.
- 26. Pignolo RJ, Samsonraj RM, Law SF, et al. Targeting Cell Senescence for the Treatment of Age-Related Bone Loss. *Curr Osteoporos Rep.* 2019 Apr;17(2):70-85.
- 27. Khosla S, Farr JN, Kirkland JL. Inhibiting Cellular Senescence: A New Therapeutic Paradigm for Age-Related Osteoporosis. *J Clin Endocrinol Metab.* 2018 Apr 1;103(4):1282-90.
- 28. Geng Q, Gao H, Yang R, et al. Pyrroloquinoline Quinone Prevents Estrogen Deficiency-Induced Osteoporosis by Inhibiting Oxidative Stress and Osteocyte Senescence. Int J Biol Sci. 2019;15(1):58-68.
- Wu X, Li J, Zhang H, et al. Pyrroloquinoline quinone prevents testosterone deficiency-induced osteoporosis by stimulating osteoblastic bone formation and inhibiting osteoclastic bone resorption. *Am J Transl Res.* 2017;9(3):1230-42.

- 30. Kong L, Yang C, Yu L, et al. Pyrroloquinoline quinine inhibits RANKLmediated expression of NFATc1 in part via suppression of c-Fos in mouse bone marrow cells and inhibits wear particle-induced osteolysis in mice. *PLoS One*. 2013;8(4):e61013.
- Huang Y, Chen N, Miao D. Pyrroloquinoline quinone plays an important role in rescuing Bmi-1(-/-) mice induced developmental disorders of teeth and mandible--anti-oxidant effect of pyrroloquinoline quinone. *Am J Transl Res.* 2018;10(1):40-53.
- 32. Huang Y, Chen N, Miao D. Effect and mechanism of pyrroloquinoline quinone on anti-osteoporosis in Bmi-1 knockout mice-Anti-oxidant effect of pyrroloquinoline quinone. *Am J Transl Res.* 2017;9(10):4361-74.
- 33. Blanch M, Mosquera JL, Ansoleaga B, et al. Altered Mitochondrial DNA Methylation Pattern in Alzheimer Disease-Related Pathology and in Parkinson Disease. *Am J Pathol.* 2016 Feb;186(2):385-97.
- 34. Macdonald R, Barnes K, Hastings C, et al. Mitochondrial abnormalities in Parkinson's disease and Alzheimer's disease: can mitochondria be targeted therapeutically? *Biochem Soc Trans.* 2018 Aug 20;46(4):891-909.
- 35. Zhang Q, Chen S, Yu S, et al. Neuroprotective effects of pyrroloquinoline quinone against rotenone injury in primary cultured midbrain neurons and in a rat model of Parkinson's disease. *Neuropharmacology.* 2016 Sep;108:238-51.
- 36. Zhang Q, Zhang J, Jiang C, et al. Involvement of ERK1/2 pathway in neuroprotective effects of pyrroloquinoline quinine against rotenoneinduced SH-SY5Y cell injury. *Neuroscience*. 2014 Jun 13;270:183-91.
- 37. Zadori D, Veres G, Szalardy L, et al. Alzheimer's Disease: Recent Concepts on the Relation of Mitochondrial Disturbances, Excitotoxicity, Neuroinflammation, and Kynurenines. J Alzheimers Dis. 2018;62(2):523-47.
- 38. Available at: https://www.sciencedaily.com/terms/excitotoxicity.htm. Accessed March 4, 2020.
- 39. Guan S, Xu J, Guo Y, et al. Pyrroloquinoline quinone against glutamate-induced neurotoxicity in cultured neural stem and progenitor cells. *Int J Dev Neurosci.* 2015 May;42:37-45.





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References

- 1. Mutagenesis. 2015;30(1):129-37. 2. Curr Opin Clin Nutr Metab Care.
- 2013;16(6):688-97. 3. Circ J. 2010;74(3):578-88.
- 5. BMC Musculoskelet Disord. 2009;10:110.
- 6. J Transl Med. 2015:13:79.

4. Nutrition. 2014;30(3):337-42.



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References 1. *Alt Med Rev*. 2009; 14(3):268-77. 2. *J Nutr*. 2006 Feb;136(2):390-6.

Exp Biol Med (Maywood). 2003
 Feb;228(2):160-6.
 Biochim Biophys Acta. 2006
 Nov;1760(11):1741-8.

5. J Biol Chem. 2010 Jan 1;285:142-52.
6. Cardiovasc Drugs Ther. 2004 Nov;18(6):421-31.

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> 7. J Cardiovasc Pharmacol Ther. 2006 Jun;11 (2):119-28. 8. FOOD Style. 2009;21:13(7)50-3.



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BLUEBERRIES Reduce Heart Disease Risk Factors

BY CHANCELLOR FALOON

Blueberries contain potent **polyphenols** that provide a wide array of health benefits.¹

Ingestion of blueberry polyphenols may decrease the risk for cognitive decline,^{2,3} cancer,^{4,5} and heart disease.^{6,7}

Researchers are discovering a stronger connection between blueberries and **heart** health than had previously been known.

They are finding that blueberries help protect against arterial blockage and improve peripheral arterial function.

Blueberry polyphenols including *anthocyanins* and *anthocyanidins*, may function as inhibitors of some underlying causes of heart disease.

Preventing Foam Cell Formation Protects the Artery Walls

The majority of heart disease is caused by **athero-sclerosis**, which is the buildup of fatty deposits (plaque) that narrow the artery walls.^{7,8}

A critical step in the development of atherosclerosis is the adhesion of **monocytes** (a type of white blood cell) to the **endothelial cells** that line the artery walls.^{9,10}

These monocytes enter the blood vessel lining and develop into **macrophages** which have the job of engulfing **oxidized** LDL cholesterol. Accumulation of oxidized LDL particles in the macrophage leads to the formation of **foam cells**.^{9,10}

The accumulation of foam cells, along with the proliferation of smooth muscle cells and excess connective tissue, are key drivers of **atherosclerosis**.^{9,10}

The process by which atherosclerosis causes a heart attack is complex. **Foam cells** play a <u>central role</u> in the **inflammation** that drives this process.¹¹

Several studies have demonstrated that **blueberry** consumption can *interfere* with the **adhesion** of monocytes to endothelial cells and reduce the formation of these foam cells. What this means is that blueberries may play a role in reducing the formation of atherosclerosis.

In one study, a group of researchers tested mice that were genetically prone to develop atherosclerosis and fed them a diet with or without the addition of blueberries. After 20 weeks, blueberry supplementation attenuated foam cell formation, compared to the control group. Researchers observed that in supplemented mice, the expression of receptors associated with the development of **foam cells** and vascular lesion formation was inhibited.¹²

Blueberries Reduce Metabolic Syndrome

In a more recent study, researchers evaluated the effects of blueberry consumption on indicators of oxidative stress and inflammation in patients with **metabolic syndrome**.¹³

Metabolic syndrome is a cluster of conditions that includes some combination of high blood pressure, abdominal obesity, high blood sugar, and abnormal lipid profiles. Metabolic syndrome is associated with a highly pro-inflammatory environment in the body, and a sharp increase of risk for heart disease, stroke, and diabetes.^{14,15}

For the study, one group of patients received a smoothie containing **22.5 grams** of freeze-dried blueberries (approximately two cups of fresh blueberries). The other group received a placebo smoothie twice daily.

After six weeks, blueberry supplementation markedly decreased superoxide and total reactive oxygen species in whole blood and monocytes compared to placebo. Supplemented patients also had a reduced expression of inflammatory markers in the monocytes.

The researchers noted that to their knowledge, this was the first study to yield significant improvements in oxidative and inflammatory parameters in patients with metabolic syndrome after just six weeks of **blueberry** consumption.

Blueberries Enhance Statin Benefits

Recent data have shown that one of the ways statins (cholesterol-lowering drugs) benefit the cardiovascular system is by reducing oxidative stress.¹⁶⁻¹⁸

A group of researchers hypothesized that adding blueberry polyphenols to a low-dose statin would enhance its benefits.¹⁹



Not Everyone Can Afford Blueberries

Fresh blueberries in stores can be expensive. This is in part due to the high rate of spoilage if they are not sold and eaten quickly, as well as the price of shipping the fruit.

Studies presented in this article show that consumption of about **two cups** of blueberries **daily** is protective, an amount that is more easily and affordably achieved with just two blueberry extract capsules per day.



To test their hypothesis, they fed a group of rats a high-fat diet to induce hypercholesterolemia. A total of six groups of six rats each were assigned to receive a statin or blueberry extract alone (high and low dose), a combination of a statin with a high- and a low-dose blueberry extract, and a control.¹⁹

After 14 days, the researchers tested the rats' weight and several biomarkers for cardiovascular disease risk: LDL and HDL cholesterol, total cholesterol, triglycerides, creatine kinase, homocysteine, and multiple markers for oxidative and DNA damage.

This study showed that blueberry extract supplementation protected against weight gain, improved lipid profiles, and reduced oxidative stress in hypercholesterolemic rats. The high-dose blueberry extract, in combination with a statin, was more effective than the blueberry extract alone.

Approximately a quarter of the U.S. adult population is taking a statin.²⁰ Statin drugs significantly reduce **LDL cholesterol** levels. But taken alone, it is not the optimal approach to promote a healthy heart. A multifaceted approach should be taken to safely reduce all the risk factors of heart disease.

Beneficial Gene Expression

In a cell culture study, researchers dove deep into the molecular properties behind the mechanisms that drive the benefits of blueberries.²¹

To determine the physiologically relevant concentrations of blueberry-derived polyphenol compounds,

WHAT YOU NEED TO KNOW

Blueberry Benefits

- Blueberries contain high amounts of polyphenols which offer a wide array of health benefits.
- Ingestion of blueberry polyphenols may decrease the risk for cognitive decline, cancer, and heart disease.
- Polyphenols in blueberries, including anthocyanins and anthocyanidins, may function as inhibitors of some underlying causes of heart disease.
- Blueberries may play a role in reducing the formation of atherosclerosis.
- Consumption of about two cups of blueberries daily is protective, an amount that is more easily and affordably achieved with just two blueberry extract capsules per day.

the researchers recruited three healthy individuals and measured their blood for polyphenol metabolites following a single intake of blueberry juice.

This allowed researchers to identify a polyphenol mixture to be tested in endothelial cells for their ability to induce **nuclear factor erythroid 2-related factor 2** (Nrf2). **Nrf2** is a key factor in inducing the activity of genes that regulate the body's defenses against oxidative stress.

What the researchers discovered is that blueberries and other polyphenol metabolites are bioactive, and significantly up-regulate the beneficial Nrf2 pathway. This finding further explains the systemic benefits blueberries have shown in previous studies.

The **Nrf2** pathway has received a lot of attention from researchers, including for development of drugs that upregulate **Nrf2 signaling** as a therapeutic approach against several chronic diseases.²²

Blueberries Ameliorate Cardiovascular Damage from Smoking

A team of researchers investigated whether blueberry polyphenols can reduce oxidative stress and inflammation and promote healthy nitric-oxide-mediated endothelial function *in smokers*. Because cigarette smoking has the opposite effects—promoting oxidative stress and inflammation, and inducing *endothelial dysfunction*, this created a strong experimental challenge for blueberries' cardiovascular health benefits.

Specifically, the trial measured the effect of a single serving of **300 grams** (two cups) of blueberries on blood pressure, heart rate, and peripheral arterial function.²³

Sixteen male cigarette smokers were separated into three groups based on the experimental conditions (smoking one cigarette, smoking plus ingesting **300 grams of** blueberry, or drinking a **300 mL** sugar-containing control beverage). All patients rotated among the treatments with a one-week wash-out period in between.

Blueberry treatment significantly counteracted the temporary impairment of peripheral arterial function and the rise in systolic blood pressure caused by acute exposure to cigarette smoke.

What these results indicate is that even with the profound health consequences from smoking, blueberries can still shield against **some** of the cardiovascular damage. Of course, the most important thing smokers can do for their health is to quit smoking. Unfortunately, that is easier said than done. So, the ability of blueberries to partially protect against this damage is truly welcome.

Summary

Research shows that blueberry consumption and supplementation can shield against multiple risk factors for heart disease.

Noteworthy is that **blueberries** favorably affect a key factor in the development of **atherosclerosis** by impeding the formation of **foam cells**.

This new research suggests that those who are at an elevated risk for heart disease should seek to increase their **blueberry polyphenol** intake. •

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

- Miller K, Feucht W, Schmid M. Bioactive Compounds of Strawberry and Blueberry and Their Potential Health Effects Based on Human Intervention Studies: A Brief Overview. *Nutrients.* 2019 Jul 2;11(7).
- Bowtell JL, Aboo-Bakkar Z, Conway ME, et al. Enhanced task-related brain activation and resting perfusion in healthy older adults after chronic blueberry supplementation. *Appl Physiol Nutr Metab.* 2017 Jul;42(7):773-9.
- Boespflug EL, Eliassen JC, Dudley JA, et al. Enhanced neural activation with blueberry supplementation in mild cognitive impairment. *Nutr Neurosci.* 2018 May;21(4):297-305.
- Baby B, Antony P, Vijayan R. Antioxidant and anticancer properties of berries. Crit Rev Food Sci Nutr. 2018;58(15):2491-507.
- Davidson KT, Zhu Z, Balabanov D, et al. Beyond Conventional Medicine - a Look at Blueberry, a Cancer-Fighting Superfruit. *Pathol Oncol Res.* 2018 Oct;24(4):733-8.
- Kalt W, Cassidy A, Howard LR, et al. Recent Research on the Health Benefits of Blueberries and Their Anthocyanins. *Adv Nutr.* 2019 Jul 22.
- Wu X, Wang TTY, Prior RL, et al. Prevention of Atherosclerosis by Berries: The Case of Blueberries. *J Agric Food Chem.* 2018 Sep 5;66(35):9172-88.
- Available at: https://www.nia.nih.gov/health/heart-health-and-aging. Accessed February 24, 2020.
- Bergheanu SC, Bodde MC, Jukema JW. Pathophysiology and treatment of atherosclerosis : Current view and future perspective on lipoprotein modification treatment. *Neth Heart J.* 2017 Apr;25(4):231-42.
- Available at: https://www.merckmanuals.com/professional/cardiovascular-disorders/arteriosclerosis/atherosclerosis. Accessed February 26, 2020.
- Available at: https://www.sciencedirect.com/topics/medicine-anddentistry/foam-cell. Accessed February 26, 2020.
- Xie C, Kang J, Chen JR, et al. Lowbush blueberries inhibit scavenger receptors CD36 and SR-A expression and attenuate foam cell formation in ApoE-deficient mice. *Food Funct*. 2011 Oct:2(10):588-94.
- Nair AR, Mariappan N, Stull AJ, et al. Blueberry supplementation attenuates oxidative stress within monocytes and modulates immune cell levels in adults with metabolic syndrome: a randomized, doubleblind, placebo-controlled trial. *Food Funct.* 2017 Nov 15;8(11):4118-28.
- Available at: https://www.nhlbi.nih.gov/health/health-topics/topics/ ms. Accessed February 27, 2020.
- Grandl G, Wolfrum C. Hemostasis, endothelial stress, inflammation, and the metabolic syndrome. *Semin Immunopathol.* 2018 Feb;40(2):215-24.
- Marchio P, Guerra-Ojeda S, Vila JM, et al. Targeting Early Atherosclerosis: A Focus on Oxidative Stress and Inflammation. Oxid Med Cell Longev. 2019;2019:8563845.
- Hayashi T, Mori T, Yamashita C, et al. Regulation of oxidative stress and cardioprotection in diabetes mellitus. *Curr Cardiol Rev.* 2008 Nov;4(4):251-8.
- Lim S, Barter P. Antioxidant effects of statins in the management of cardiometabolic disorders. *J Atheroscler Thromb.* 2014;21(10):997-1010.
- Stroher DJ, Escobar Piccoli Jda C, Gullich AA, et al. 14 Days of supplementation with blueberry extract shows anti-atherogenic properties and improves oxidative parameters in hypercholesterolemic rats model. *Int J Food Sci Nutr.* 2015;66(5):559-68.
- 20. Available at: https://www.cdc.gov/nchs/products/databriefs/db177. htm. Accessed February 27, 2020.
- Tang JS, Vissers MCM, Anderson RF, et al. Bioavailable Blueberry-Derived Phenolic Acids at Physiological Concentrations Enhance Nrf2-Regulated Antioxidant Responses in Human Vascular Endothelial Cells. *Mol Nutr Food Res.* 2018 Mar;62(5).
- 22. Robledinos-Anton N, Fernandez-Gines R, Manda G, et al. Activators and Inhibitors of NRF2: A Review of Their Potential for Clinical Development. *Oxid Med Cell Longev.* 2019;2019:9372182.
- 23. Del Bo C, Porrini M, Fracassetti D, et al. A single serving of blueberry (V. corymbosum) modulates peripheral arterial dysfunction induced by acute cigarette smoking in young volunteers: a randomizedcontrolled trial. *Food Funct*. 2014 Dec;5(12):3107-16.

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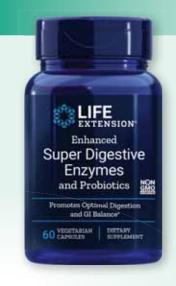
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Extra Virgin Olive Oil Protects the Heart and Slashes Breast Cancer Risk

BY CHERYL HOPKINS



All olive oil isn't the same.

There are different grades of olive oil available, with very different health properties. Unfortunately, it's not always easy to tell which olive oil you are getting. (Hint: *extra virgin* olive oil is the healthy kind you want.)

In a 2019 published study, mice fed **extra virgin olive oil** had significantly *lower* total cholesterol and blood pressure, and a *higher* ratio of HDL (good) cholesterol to LDL (bad) cholesterol, compared to mice fed **refined olive oil**.¹

The two types of olive oil examined in this mouse study might be sold side-by-side in stores, but it is a mistake to view them equally.

The study showed that eating *refined* olive oil led to similar adverse results as ingesting butter.¹

One reason is the way different grades of olive oil are extracted, and their effects on **gut microbiota**. What surprised scientists was learning how *extra virgin* olive oil interacts with host microbiota to improve **heart** health.

Why Extra Virgin Olive Oil is Better

Olive oil has widely publicized health benefits compared to other vegetable oils and animal fats.^{2,3} It is a staple of the highly recommended **Mediterranean diet**.

But not all olive oils are the same. When olives are freshly pressed to extract the oil, the first material that's produced, without any chemical processing, is **extra virgin olive oil**.^{1,4,5}

In this instance, the term "virgin" means the olive oil is unprocessed.

It's rich in **polyphenols**, plant nutrients with a wide range of health benefits, and **tocopherols**, variations on vitamin E that provide protection against oxidative stress.¹

Although these compounds are the source of much of extra virgin olive oil's health benefits, high amounts can result in strong or biting flavors that are not to everyone's taste.⁶

Refined olive oil (the label may simply say "olive oil", but it cannot say "*extra virgin* olive oil") has been subjected to chemical treatments to make it nearly flavorless, odorless, and colorless. Manufacturers may then add back a small amount of extra virgin olive oil to impart a little flavor.

The refining process does more than strip out the flavor, color, and aroma—it also strips out practically all of the **polyphenols** and tocopherols, leaving the oil devoid of the most beneficial compounds.^{4,5}

The polyphenol content of extra virgin olive oil ranges between **150 mg/kg** to **400 mg/kg**, while that of refined olive oil is just **0 mg/kg** to **5 mg/kg**. This makes a huge difference in the health benefits of the two types of oil.^{1,7}

Comparing Extra Virgin and Refined Olive Oil

A group of Spanish scientists compared the effects of extra virgin and refined olive oil on body weight, blood pressure, plasma insulin and lipid profiles, and other factors.¹

The researchers fed a different diet to each of four groups of mice:¹

- Standard, grain-rich mouse food, in which **8%** of calories came from fat,
- Standard mouse food with extra virgin olive oil added, for a high-fat diet with 38% more calories, 35% coming from fat,
- Standard food enriched with refined olive oil to the same level of calories and fat, and
- Standard food enriched with butter to the same fat and calorie level.

At the end of 12 weeks, systolic blood pressure, lipids, and other factors that contribute to the risk of cardiovascular and metabolic diseases were measured. Feces were also collected for **microbiome** analysis, and blood samples were taken for biochemical analysis.

Surprising Findings

The results of this study showed a significant impact on risk factors for disease—and changes in gut microbiota that suggested reasons for those changes.¹

Body weight, systolic (top number) blood pressure, and plasma insulin were significantly *higher* in the **butter-fed** group. That makes sense. Butter is an animal fat high in saturated fats and calories.

But here's where it gets surprising: Mice fed the low-fat standard diet and the **extra virgin olive oil** diet had significantly **lower total cholesterol** than the mice fed butter or



refined olive oil, even though there is no cholesterol in refined olive oil.

Extra virgin olive oil produced the *highest* ratio of HDL (good) cholesterol to LDL (bad) cholesterol, even higher than the lower-calorie standard diet. The animals who ate *refined* olive oil had HDL/LDL ratios similar to those of mice fed **butter**.

Animals fed **extra virgin** olive oil also had *lower* **blood pressure** than any other group.¹

How the Gut Microbiota are Involved

The scientists also examined the different effects on **gut microbiota** composition.

The impact of the dietary fat source on gut microbiota composition was substantial—in ways that correlate with many of the common risk factors for degenerative diseases.¹

There were significant differences in the levels of different gut bacterial families among the groups ingesting *extra virgin* olive oil, *refined* olive oil or **butter**.

One bacterial group in particular, called **Desulfovibrionaceae**, was significantly *higher* in those fed *refined* olive oil and butter, compared with those given *extra virgin* olive oil and the standard diet.¹

These intestinal bacteria are associated with **high levels of inflammation** and **impaired immune function**—risk factors for metabolic syndrome, cardiovascular disease, and autoimmune disorders.⁸⁻¹¹

Two other bacterial families were elevated in mice fed **refined** olive oil compared with the other diets.¹ Both have *negative* associations with human health, including cancers and inflammatory diseases.¹²⁻²⁰



Large Human Trial Demonstrates Extra Virgin Olive Oil Reduces Cardiovascular and Breast Cancer Risks

Results of a large clinical trial published in two prestigious medical journals, *JAMA Internal Medicine* and the *New England Journal of Medicine*, demonstrate that a diet supplemented with **extra virgin olive oil** provides health benefits.^{22,23}

The **PREDIMED** study enrolled adults aged 55 to 80 who were considered at high risk for cardiovascular disease based on various factors.

Participants were randomized to three different groups. Two of the groups were assigned to a Mediterranean diet, one with supplemental *extra virgin* olive oil (at least 4 tbsp) and the other supplemented with mixed nuts. The third group was assigned to a control, low-fat diet.

Over almost five years of follow-up, cardiovascular outcomes including heart attack, stroke, and death from any cardiovascular cause, were noted. The Mediterranean diet groups had a significantly lower rate of negative cardiovascular outcomes. This association was particularly strong for the supplemental *extra virgin* olive oil group, which had a **31%** reduction in risk for cardiovascular disease outcomes compared to the control diet group.²²

The researchers also observed the rate of new breast cancer in the women enrolled. Here, too, the diet supplemented with extra virgin olive oil was most protective, reducing rates of breast cancer by nearly **70%** compared to the control diet. Interestingly, the group that supplemented with mixed nuts did not show a significant benefit in terms of breast cancer risk.²³

The study's authors report that this was the first human trial to find a beneficial effect of a dietary intervention on breast cancer risk. Together, these results suggest that a Mediterranean diet with supplemental extra virgin olive oil is protective against both cardiovascular disease and breast cancer in older adults with existing risk factors. Two beneficial bacterial families were found in *highest* abundance in animals fed the **extra virgin olive oil**. Both of them are associated with improved metabolic functions, including lowering levels of insulin and leptin.^{1,21}

Summary

This new preclinical mouse study adds support for the benefits of extra virgin olive oil.

Compared with butter and refined olive oil, **extra virgin olive oil** improved systolic blood pressure, insulin levels, cholesterol, and HDL/ LDL cholesterol ratios. Those all lead to *lower* risks for cardiovascular and metabolic diseases.

The study also showed a likely reason: A diet rich in extra virgin olive oil favorably modulates bacterial families associated with multiple diseases, while boosting microbes with protective effects.¹

Human findings show supplemental extra virgin olive oil can markedly reduce cardiovascular and breast cancer risks in those following a Mediterranean-type diet.

Health-conscious people should aim to use **extra virgin olive oil** in their diets, and not refined olive oil or butter. •

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

 Martinez N, Prieto I, Hidalgo M, et al. Refined versus Extra Virgin Olive Oil High-Fat Diet Impact on Intestinal Microbiota of Mice and Its Relation to Different Physiological Variables. *Microorganisms*. 2019 Feb 23;7(2).



- Gillingham LG, Harris-Janz S, Jones PJ. Dietary monounsaturated fatty acids are protective against metabolic syndrome and cardiovascular disease risk factors. *Lipids*. 2011 Mar;46(3):209-28.
- Martinez-Gonzalez MA, Martin-Calvo N. The major European dietary patterns and metabolic syndrome. *Rev Endocr Metab Disord.* 2013 Sep;14(3):265-71.
- Available at: https://www.ams.usda.gov/ grades-standards/olive-oil-and-olive-pomace-oil-grades-and-standards. Accessed March 5, 2020.
- 5. Available at: http://cesonoma.ucanr.edu/ files/27425.pdf. Accessed March 5, 2020.
- Vazquez-Araujo L, Adhikari K, Chambers Et, et al. Cross-cultural perception of six commercial olive oils: A study with Spanish and US consumers. *Food Sci Technol Int.* 2015 Sep;21(6):454-66.
- Gorzynik-Debicka M, Przychodzen P, Cappello F, et al. Potential Health Benefits of Olive Oil and Plant Polyphenols. *Int J Mol Sci.* 2018 Feb 28;19(3).
- Figliuolo VR, Dos Santos LM, Abalo A, et al. Sulfate-reducing bacteria stimulate gut immune responses and contribute to inflammation in experimental colitis. *Life Sci.* 2017 Nov 15;189:29-38.
- Loubinoux J, Bronowicki JP, Pereira IA, et al. Sulfate-reducing bacteria in human feces and their association with inflammatory bowel diseases. *FEMS Microbiol Ecol.* 2002 May 1;40(2):107-12.
- Tremlett H, Fadrosh DW, Faruqi AA, et al. Gut microbiota in early pediatric multiple sclerosis: a case-control study. *Eur J Neurol.* 2016 Aug;23(8):1308-21.
- Yang Q, Lin SL, Kwok MK, et al. The Roles of 27 Genera of Human Gut Microbiota in Ischemic Heart Disease, Type 2 Diabetes Mellitus, and Their Risk Factors: A Mendelian Randomization Study. *Am J Epidemiol.* 2018 Sep 1;187(9):1916-22.
- de Martel C, Plummer M, Parsonnet J, et al. Helicobacter species in cancers of the gallbladder and extrahepatic biliary tract. *Br J Cancer.* 2009 Jan 13;100(1):194-9.
- Eaton KA, Opp JS, Gray BM, et al. Ulcerative typhlocolitis associated with Helicobacter mastomyrinus in telomerase-deficient mice. *Vet Pathol.* 2011 May;48(3):713-25.

- 14. Foltz CJ, Fox JG, Cahill R, et al. Spontaneous inflammatory bowel disease in multiple mutant mouse lines: association with colonization by Helicobacter hepaticus. *Helicobacter.* 1998 Jun;3(2):69-78.
- Laharie D, Asencio C, Asselineau J, et al. Association between entero-hepatic Helicobacter species and Crohn's disease: a prospective cross-sectional study. *Aliment Pharmacol Ther.* 2009 Aug;30(3):283-93.
- Langgartner D, Peterlik D, Foertsch S, et al. Individual differences in stress vulnerability: The role of gut pathobionts in stressinduced colitis. *Brain Behav Immun.* 2017 Aug;64:23-32.
- Le Roux-Goglin E, Dubus P, Asencio C, et al. Hepatic lesions observed in hepatitis C virus transgenic mice infected by Helicobacter hepaticus. *Helicobacter.* 2013 Feb;18(1):33-40.
- Pandey M. Helicobacter species are associated with possible increase in risk of biliary lithiasis and benign biliary diseases. *World J Surg Oncol.* 2007 Aug 20;5:94.
- Bae SE, Choi KD, Choe J, et al. The effect of eradication of Helicobacter pylori on gastric cancer prevention in healthy asymptomatic populations. *Helicobacter*. 2018 Apr;23(2):e12464.
- Tomasello G, Giordano F, Mazzola M, et al. Helicobacter pylori and Barretts esophagus: a protective factor or a real cause? *J Biol Regul Homeost Agents*. 2017 Jan-Mar;31(1):9-15.
- Pan H, Guo J, Su Z. Advances in understanding the interrelations between leptin resistance and obesity. *Physiol Behav.* 2014 May 10;130:157-69.
- 22. Estruch R, Ros E, Salas-Salvado J, et al. Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts. *N Engl J Med.* 2018 Jun 21;378(25):e34.
- Toledo E, Salas-Salvado J, Donat-Vargas C, et al. Mediterranean Diet and Invasive Breast Cancer Risk Among Women at High Cardiovascular Risk in the PREDIMED Trial: A Randomized Clinical Trial. JAMA Intern Med. 2015 Nov;175(11):1752-60.

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Black Beans

BY LAURIE MATHENA



Like many legumes, **black beans** originated in South and Central America, but their taste and versatility have made them popular the world over.

The signature black coat of the bean contains key phytonutrients and anthocyanins that are often more commonly associated with dark-colored fruits and vegetables. And with **15 grams** of protein per cup, black beans have become a staple food for vegetarians and vegans.

Black beans are cost-effective, versatile, and chock full of vitamins and minerals, making this superfood a perfect addition to any healthy diet.

Diabetes

Black beans have a **low glycemic index**, which means they are more slowly digested and cause a slower rise in blood sugar levels.

This is because most of the starch in black beans is **resistant starch**, which is not easily digested. This allows it to pass through the digestive tract without being broken down, which prevents it from being converted to simple sugars.

Black beans can also help attenuate the blood sugar spikes caused by higher glycemic foods. In one study, when adults with type II diabetes consumed black beans with rice, it helped lessen the blood sugar spikes associated with eating rice alone.¹

Cancer and Heart Disease

Black beans' shells are an excellent source of phytonutrients and **anthocyanins**, such as malvidin, delphinidin, and petunidin.

Anthocyanins have numerous **anticancer effects**—including antiinflammation, anti-mutagenesis, inducing cell cycle arrest, stimulating apoptosis of cancer cells, preventing cancer cells from spreading, and even making cancer cells more sensitive to chemotherapy.²

Epidemiological studies suggest that consuming more anthocyanins reduces the risk of **cardiovascular disease**.³ This is likely due in part to their beneficial effect on endothelial function and inflammation.

Additionally, black beans are high in fiber, higher intake of which has been associated with a lower risk of colorectal cancer.⁴

References

- 1. Nutr J. 2012 Apr 11;11:23.
- 2. Br J Pharmacol. 2017 Jun;174(11):1226-43.
- 3. Adv Nutr. 2011 Jan;2(1):1-7.
- 4. BMJ. 2011 Nov 10;343:d6617.

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- 00607 DHEA (Dehydroepiandrosterone) 25 mg, 100 tablets (dissolve in mouth)
- 01689 DHEA (Dehydroepiandrosterone) 100 mg, 60 veg capsules
- 02368 Optimized Broccoli and Cruciferous Blend
- 00302 Pregnenolone 50 mg, 100 capsules
- 00700 Pregnenolone 100 mg, 100 capsules
- 01468 Triple Action Cruciferous Vegetable Extract
- 01469 Triple Action Cruciferous Vegetable Extract with Resveratrol

IMMUNE SUPPORT

- 00681 AHCC®
- 02302 Bio-Quercetin
- 01961 Enhanced Zinc Lozenges
- 01704 Immune Modulator with Tinofend®
- 00955 Immune Protect with PARACTIN®
- 02005 Immune Senescence Protection Formula™

PRODUCTS

- 29727 Kinoko[®] Gold AHCC
- 24404 Kinoko® Platinum AHCC
- 00316 Kyolic[®] Garlic Formula 102
- 00789 Kyolic[®] Reserve
- 01681 Lactoferrin (Apolactoferrin) Caps
- 01903 NK Cell Activator™
- 01394 Optimized Garlic
- 01309 Optimized Quercetin
- 01811 Peony Immune
- 00525 ProBoost Thymic Protein A
- 01708 Reishi Extract Mushroom Complex
- 01906 Standardized Cistanche
- 13685 Ten Mushroom Formula®
- 01097 Ultra Soy Extract
- 01561 Zinc Lozenges

INFLAMMATION MANAGEMENT

- 01639 5-LOX Inhibitor with AprèsFlex®
- 02324 Advanced Curcumin Elite™
 - Turmeric Extract, Ginger & Turmerones
- 01709 Black Cumin Seed Oil
- 02310 Black Cumin Seed Oil and Curcumin Elite™ Turmeric Extract
- 00202 Boswella
- 02467 Curcumin Elite[™] Turmeric Extract 30 veg capsules
- 02407 Curcumin Elite™ Turmeric Extract 50 veg capsules
- 01804 Cytokine Suppress[®] with EGCG
- 02223 Pro-Resolving Mediators
- 00318 Serraflazyme
- 01203 Specially-Coated Bromelain
- 01254 Zyflamend[™] Whole Body

JOINT SUPPORT

- 02404 Arthro-Immune Joint Support
- 02238 ArthroMax[®] Advanced NT2 Collagen[™] & AprèsFlex[®]
- 01617 ArthroMax® with Theaflavins & AprèsFlex®
- 02138 ArthroMax[®] Elite
- 00965 Fast-Acting Joint Formula
- 00522 Glucosamine/Chondroitin Capsules
- 01600 Krill Healthy Joint Formula
- 01050 Krill Oil
- 00451 MSM (Methylsulfonylmethane)
- 02231 NT2 Collagen™

00550 Chlorella

01571 Chlorophyllin

01393 HepatoPro

KIDNEY & BLADDER SUPPORT

- 00862 Cran-Max[®] Cranberry Whole Fruit Concentrate
- 01424 Optimized Cran-Max[®] with Ellirose[™]
- 01921 Uric Acid Control

01651 Calcium D-Glucarate

01209 Water-Soluble Pumpkin Seed Extract

02240 Anti-Alcohol HepatoProtection Complex

LIVER HEALTH & DETOXIFICATION

01922 European Milk Thistle • 60 softgels

02402 FLORASSIST[®] Liver Restore[™]

01541 Glutathione, Cysteine & C

01608 Liver Efficiency Formula

01534 N-Acetyl-L-Cysteine

01925 European Milk Thistle • 120 softgels

01522 European Milk Thistle • 60 veg capsules

00342 PectaSol-C[®] Modified Citrus Pectin Powder01080 PectaSol-C[®] Modified Citrus Pectin Capsules01884 Silymarin

LONGEVITY & WELLNESS

- 00457 Alpha-Lipoic Acid 01625 AppleWise Polyphenol Extract 01214 Blueberry Extract 01438 Blueberry Extract with Pomegranate 02270 DNA Protection Formula 02119 GEROPROTECT[®] Ageless Cell[™] 02133 GEROPROTECT[®] Longevity A.I.™ 02401 GEROPROTECT® Stem Cell 02211 Grapeseed Extract 00954 Mega Green Tea Extract (decaffeinated) 00953 Mega Green Tea Extract (lightly caffeinated) 01513 Optimized Fucoidan with Maritech® 926 02230 Optimized Resveratrol 01637 Pycnogenol® French Maritime Pine Bark Extract 02210 Resveratrol 00070 RNA (Ribonucleic Acid) 02301 Senolytic Activator 01208 Super R-Lipoic Acid 01919 X-R Shield **MEN'S HEALTH**
- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 02306 Men's Bladder Control
- 01789 PalmettoGuard® Saw Palmetto with Beta-Sitosterol
- 01790 PalmettoGuard[®] Saw Palmetto/Nettle Root Formula with Beta-Sitosterol
- 01837 Pomi-T®
- 01373 Prelox[®] Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 01909 Triple Strength ProstaPollen™
- 02029 Ultra Prostate Formula

MINERALS

- 01661 Boron
- 02107 Extend-Release Magnesium
- 30731 Ionic Selenium
- 01677 Iron Protein Plus
- 02403 Lithium
- 01459 Magnesium Caps
- 01682 Magnesium (Citrate)
- 01328 Only Trace Minerals
- 01504 Optimized Chromium with Crominex® 3+
- 02309 Potassium with Extend-Release Magnesium

01740 Sea-Iodine™

- 01879 Se-Methyl L-Selenocysteine
- 01778 Super Selenium Complex
- 00213 Vanadyl Sulfate
- 01813 Zinc Caps

MISCELLANEOUS

- 00577 Potassium lodide
- 00657 Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine
- 02175 SAMe (S-Adenosyl-Methionine) 200 mg, 30 enteric coated tablets
- 02176 SAMe (S-Adenosyl-Methionine) 400 mg, 30 enteric coated tablets
- 02174 SAMe (S-Adenosyl-Methionine) 400 mg, 60 enteric coated tablets

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02498 Comprehensive Nutrient Packs ADVANCED
- 02354 Life Extension Mix[™] Capsules
- 02364 Life Extension Mix[™] Capsules without Copper
- 02356 Life Extension Mix[™] Powder
- 02355 Life Extension Mix[™] Tablets
- 02357 Life Extension Mix[™] Tablets with Extra Niacin
- 02365 Life Extension Mix[™] Tablets without Copper
- 02292 Once-Daily Health Booster 30 softgels
- 02291 Once-Daily Health Booster 60 softgels
- 02313 One-Per-Day Tablets
- 02317 Two-Per-Day Capsules 60 capsules
- 02314 Two-Per-Day Capsules 120 capsules
- 02316 Two-Per-Day Tablets 60 tablets
- 02315 Two-Per-Day Tablets 120 tablets

NERVE & COMFORT SUPPORT

- 02202 ComfortMAX[™]
- 02303 PEA Discomfort Relief

PERSONAL CARE

- 01006 Biosil[™] 5 mg, 30 veg capsules
- 01007 Biosil[™] 1 fl oz
- 00321 Dr. Proctor's Advanced Hair Formula
- 00320 Dr. Proctor's Shampoo
- 02322 Hair, Skin & Nails Collagen Plus Formula
- 01278 Life Extension Toothpaste
- 00408 Venotone
- 00409 Xyliwhite Mouthwash
- 02304 Youthful Collagen
- 02252 Youthful Legs

PET CARE

- 01932 Cat Mix
- 01931 Dog Mix

PROBIOTICS

- 01622 Bifido Gl Balance
- 01825 FLORASSIST[®] Balance
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST[®] Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Nasal
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® 60 veg capsules
- 21201 Jarro-Dophilus EPS® 120 veg capsules
- 01038 Theralac® Probiotics
- 01389 TruFlora® Probiotics

SKIN CARE

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80175 Advanced Probiotic-Fermented Eye Serum
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream

80151 Anti-Aging Rejuvenating Face Cream

80153 Anti-Aging Rejuvenating Scalp Serum

80139 Amber Self MicroDermAbrasion 80118 Anti-Aging Mask

- 80169 Cucumber Hydra Peptide Eye Cr
- 80141 DNA Support Cream
- 80167 Environmental Support Serum 80163 Eye Lift Cream
- 80123 Face Rejuvenating Anti-Oxidant Cream
- 80109 Hyaluronic Facial Moisturizer
- 80110 Hyaluronic Oil-Free Facial Moisturizer
- 80138 Hydrating Anti-Oxidant Facial Mist
- 00661 Hydroderm
- 80103 Lifting & Tightening Complex
- 80168 Melatonin Advanced Peptide Cream
- 80114 Mild Facial Cleanser
- 80172 Multi Stem Cell Hydration Cream
- 80159 Multi Stem Cell Skin Tightening Complex
- 80122 Neck Rejuvenating Anti-Oxidant Cream
- 80174 Purifying Facial Mask
- 80150 Renewing Eye Cream
- 80142 Resveratrol Anti-Oxidant Serum
- 01938 Shade Factor™
- 02129 Skin Care Collection Anti-Aging Serum
- 02130 Skin Care Collection Day Cream
- 02131 Skin Care Collection Night Cream
- 80166 Skin Firming Complex
- 02096 Skin Restoring Ceramides
- 80130 Skin Stem Cell Serum
- 80164 Skin Tone Equalizer
- 80143 Stem Cell Cream with Alpine Rose
- 80148 Tightening & Firming Neck Cream
- 80161 Triple-Action Vitamin C Cream
- 80162 Ultimate MicroDermabrasion
- 80173 Ultimate Peptide Serum
- 80160 Ultra Eyelash Booster
- 80101 Ultra Wrinkle Relaxer
- 80113 Under Eye Refining Serum 80104 Under Eye Rescue Cream
- 80171 Vitamin C Lip Rejuvenator
- 80171 Vitamin C Lip Rejuve
- 80129 Vitamin C Serum 80136 Vitamin D Lotion
- 80102 Vitamin K Cream

SLEEP

- 01512 Bioactive Milk Peptides
- 02300 Circadian Sleep
- 01551 Enhanced Sleep with Melatonin
- 01511 Enhanced Sleep without Melatonin
- 02234 Fast-Acting Liquid Melatonin
- 01669 Glycine
- 02308 Herbal Sleep PM
- 01722 L-Tryptophan
- 01668 Melatonin 300 mcg, 100 veg capsules
- 01083 Melatonin 500 mcg, 200 veg capsules
- 00329 Melatonin 1 mg, 60 capsules
- 00330 Melatonin 3 mg, 60 veg capsules
- 00331 Melatonin 10 mg, 60 veg capsules
- 00332 Melatonin 3 mg, 60 veg lozenges
- 02201 Melatonin IR/XR
- 01787 Melatonin 6 Hour Timed Release 300 mcg, 100 veg tablets
- 01788 Melatonin 6 Hour Timed Release 750 mcg, 60 veg tablets
- 01786 Melatonin 6 Hour Timed Release 3 mg, 60 veg tablets
- 01721 Optimized Tryptophan Plus
- 01444 Quiet Sleep
- 01445 Quiet Sleep Melatonin

VITAMINS

- 01533 Ascorbyl Palmitate
- 00920 Benfotiamine with Thiamine
- 00664 Beta-Carotene
- 01945 BioActive Complete B-Complex
- 00102 Biotin
- 00084 Buffered Vitamin C Powder
- 02229 Fast-C[®] and Bio-Quercetin Phytosome 02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
- 02070 Gamma E Mixed Tocopherol/Tocotrienols
- 01913 High Potency Optimized Folate
- 01674 Inositol Caps Liquid Emulsified
- 02244 Liquid Vitamin D3 2,000 IU, 1 fl oz
- 02232 Liquid Vitamin D3 2,000 IU, 1 fl oz, mint
- 01936 Low-Dose Vitamin K2
- 01536 Methylcobalamin 1 mg, 60 veg lozenges
- 01537 Methylcobalamin 5 mg, 60 veg lozenges
- 00065 MK-7
- 00373 No Flush Niacin
- 01939 Optimized Folate (L-Methylfolate)
- 01217 Pyridoxal 5'-Phosphate Caps
- 01400 Super Absorbable Tocotrienols
- 02334 Super K
- 02335 Super K Elite
- 01863 Super Vitamin E
- 02028 Vitamin B5 (Pantothenic Acid)
- 01535 Vitamin B6
- 00361 Vitamin B12
- 02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 60 veg tablets
- 02227 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
- 01753 Vitamin D3 25 mcg (1,000 IU), 90 softgels
- 01751 Vitamin D3 25 mcg (1,000 IU), 250 softgels
- 01713 Vitamin D3 125 mcg (5,000 IU), 60 softgels
- 01718 Vitamin D3 175 mcg (7,000 IU), 60 softgels
- 01758 Vitamin D3 with Sea-lodine™
- 02040 Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION

- 00658 7-Keto® DHEA Metabolite 25 mg, 100 capsules 02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules 01509 Advanced Anti-Adipocyte Formula 01807 Advanced Appetite Suppress 02207 AMPK Metabolic Activator 01823 CalReduce Selective Fat Binder 02478 DHEA Complete 01738 Garcinia HCA 01292 Integra-Lean® 01908 Mediterranean Trim with Sinetrol[™] -XPur 01492 Optimized Irvingia with Phase 3[™] Calorie Control Complex 01432 Optimized Saffron with Satiereal® 00818 Super CLA Blend with Sesame Lignans 01902 Waist-Line Control[™] 02151 Wellness Code® Appetite Control **WOMEN'S HEALTH**
- 01942 Breast Health Formula
- 01626 Enhanced Sex for Women 50+

01064 Femmenessence MacaPause®

01649 Super-Absorbable Soy Isoflavones

01894 Estrogen for Women

02204 Menopause 731[™]

01441 Progesta-Care®

02319 Prenatal Advantage

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Super Omega-3

EPA/DHA Fish Oil, Sesame Lignans & Olive Extract

Advanced Fish Oil Combination

BEST SELLING SUPER OMEGA-3 FORMULA

Item #01982 • 120 softgels 1 bottle **\$24** 4 bottles \$21 each



For full product description and to order Super Omega-3 EPA/DHA with Sesame Lignans & Olive Extract, call 1-800-544-4440 or visit www.LifeExtension.com

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Three Choices of Superior Ubiquinol CoQ10 Mitochondrial Delivery Systems



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