

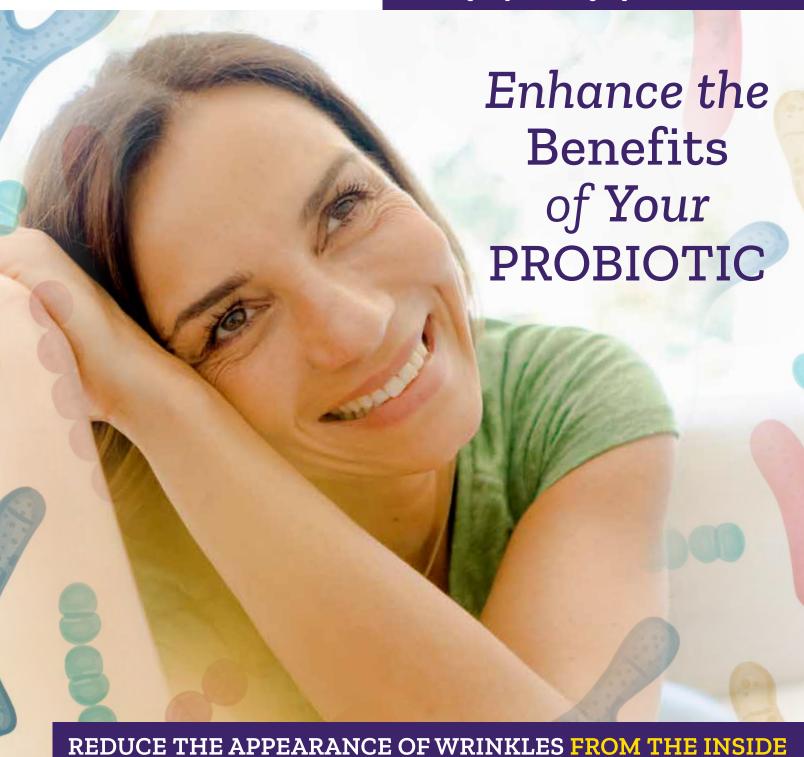
The Science of a Healthier Life™

LifeExtension.com

May/June 2020

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





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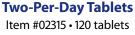
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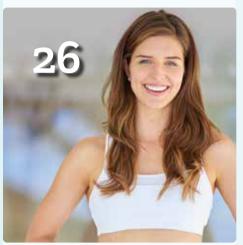
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#### 84 LONGEVITY-ENHANCING IMPACT OF LITHIUM

**Lithium** supports **telomere** length and healthy **DNA**, and slows **brain aging** at ultra-low cost.



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#### Contributors

Michael Downey • Chancellor Faloon • William Faloon • Janice Hamilton Laurie Mathena • Jacob Rose

#### Advertising

Vice President of Marketing • Rey Searles • rsearles@lifeextension.com National Advertising Manager • JT Hroncich • 404-347-4170

#### Senior Director of Sales and Business Development

Carolyn Bouchard • cbouchard@lifeextension.com • 954-202-7685

#### Circulation & Distribution

Life Extension • 3600 West Commercial Blvd., Ft. Lauderdale, FL 33309 Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989 • Email: customerservice@LifeExtension.com Wellness specialists: 800-226-2370 • Email: wellness@LifeExtension.com

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#### MEDICAL ADVISORY BOARD

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

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

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

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

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

Martin Dayton, MD, D0, practices at the Sunny Isles Medical Center in North Miami Beach, FL. His focus is on nutrition, aging, chelation therapy, holistic medicine, and oxidative medicine.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Herbert Pardell, DO, FAAIM, practices internal medicine at the Emerald Hills Medical Center in Hollywood, FL. He is a medical director of the Life Extension Foundation®.

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

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

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

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

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

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

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

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

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

Ronald L. Shuler, BS, DDS, CCN, LN, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. He is boardcertified in anti-aging medicine.

Paul Wand, MD, Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.

#### SCIENTIFIC ADVISORY BOARD



Örn Adalsteinsson, PhD, is chairman of the Life Extension® Scientific Advisory board. He holds a master's and doctorate from the Massachusetts Institute of Technology (MIT). He has specialized in human therapeutics including vaccines, monoclonal antibodies, product development, nutraceuticals, formulations, artificial intelligence, hormones, and nutritional supplementation. He has also authored articles and contributed to peer-reviewed publicationzs and served as an editor for the Journal of Medicinal Food.



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



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



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



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



Sandra C. Kaufmann, MD, is a fellowship-trained and board-certified pediatric anesthesiologist as well as the Chief of Anesthesia at the Joe DiMaggio Children's Hospital in Hollywood, Florida. She is the founder of The Kaufmann Anti-Aging Institute and the author of the book The Kaufmann Protocol: Why we Age and How to Stop it (2018). Her expertise is in the practical application of anti-aging research.



Steven B. Harris, MD, is president and director of research at Critical Care Research, a company that grew out of 21st Century Medicine in Rancho Cucamonga, CA. Dr. Harris participates in groundbreaking hypothermia, cryothermia, and ischemia research. His research interests include antioxidant and dietary-restriction effects in animals and humans.





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



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



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



Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of The Great American Heart Hoax, The Complete Mediterranean Diet and Heart Attack Proof. For more information visit www.drozner.com.



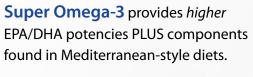
Jonathan V. Wright, MD, is medical director of the Tahoma Clinic in Tukwila, WA. He received his MD from the University of Michigan and has taught natural biochemical medical treatments since 1983. Dr. Wright pioneered the use of bioidentical estrogens and DHEA in daily medical practice. He has authored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



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



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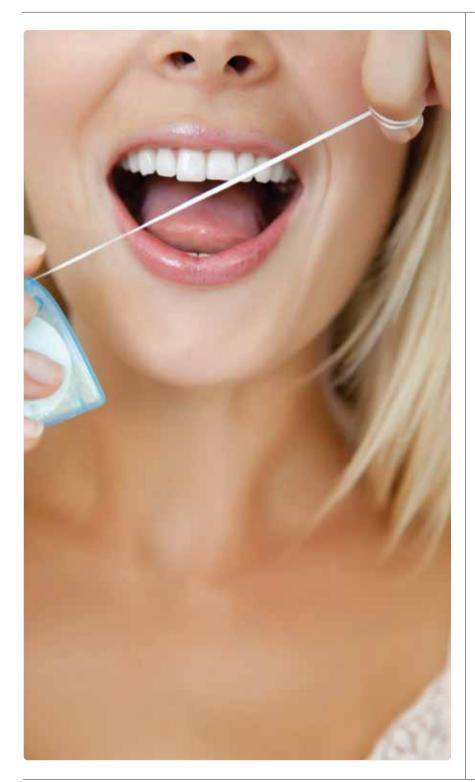
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#### In the News



#### **Atrial Fibrillation and Heart** Failure Risk are Lower with **Better Oral Hygiene**

How well you take care of your teeth is linked to your risk of atrial fibrillation and heart failure, a study published in the European Journal of Preventive Cardiology\* reported.

Better oral hygiene is associated with a lower risk of atrial fibrillation and heart failure, researchers concluded.

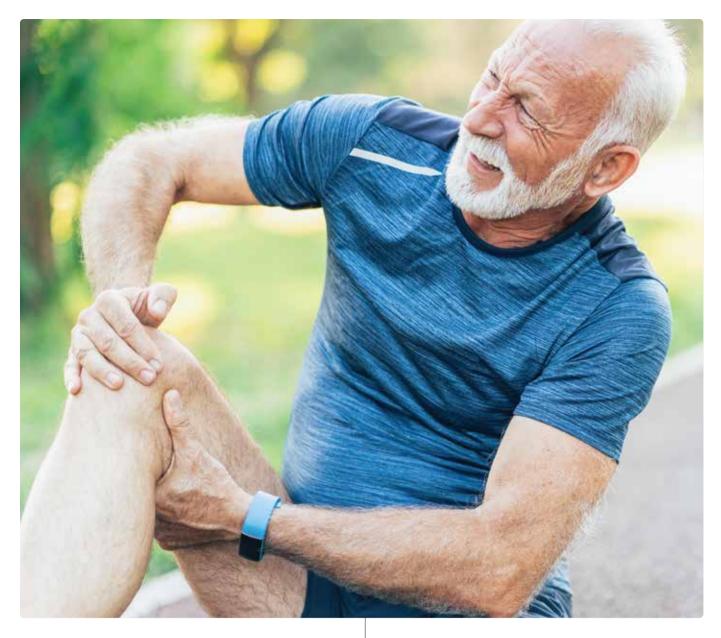
The study subjects were 161,286 men and women from the National Health Insurance System-Health Screening Cohort in Korea, aged 40 to 79, with no prior history of atrial fibrillation, heart failure, or cardiac valvular diseases. They were examined by dentists to note the presence of periodontal disease, condition of teeth, and missing teeth, and they completed a questionnaire about their oral hygiene behavior and dental symptoms.

The median follow-up was 10.5 years, during which there were 4,911 (3%) cases of atrial fibrillation and 7,971 (4.9%) cases of heart failure.

Brushing teeth three times a day or more was associated with a 10% reduced risk of atrial fibrillation and a 12% reduced risk of heart failure.

Editor's Note: "Poor oral hygiene can provoke transient bacteremia and systemic inflammation, a mediator of atrial fibrillation and heart failure," the authors stated.

\* Eur J Prev Cardiol. 2019 Dec 1.



#### PEA Safe, Effective for Knee Osteoarthritis

The journal *Inflammopharmacology* reported the outcome of a randomized, double-blind trial that revealed the safety and efficacy of supplementation with **PEA** (palmitoylethanolamide) for individuals with knee osteoarthritis.\*

The trial included 111 men and women with mild to moderate osteoarthritis in one or both knees who were given either a placebo, **300 mg** of **PEA** or **600 mg** of **PEA** daily for eight weeks. Pain, stiffness and other factors were evaluated at the beginning and end of the trial.

In comparison with the placebo group, participants who received PEA experienced significant reductions in pain (up to **57.6**%) and stiffness (up to **53.7**%) scores. Function significantly improved among those who received **600 mg** of PEA. Both doses of PEA were associated with improvements in pain intensity scores and anxiety.

By week eight, the number of participants reporting no pain had *increased* by more than two and a half times in both groups, while decreasing slightly among the placebo group compared to the beginning of the study.

**Editor's Note:** Palmitoylethanolamide is a fatty acid that is naturally produced in the body as part of a healthy immune response.

\* Inflammopharmacology. 2019 Jun;27(3):475-485.



#### **Drinking Tea Supports a Healthy Brain**

Research reported in the journal Aging revealed a brain benefit in association with regularly drinking tea.\*

Acting on the results of previous research that found a reduction in the risk of cognitive decline among daily tea drinkers, the current study compared 15 tea drinkers aged 60 and older to 21 participants in the same age group who did not regularly consume tea.

Neuropsychological tests evaluated cognitive function and magnetic resonance imaging assessed brain connectivity. Participants who regularly consumed tea had better organized brain regions and cognitive function compared to those who were not tea drinkers.

The authors noted that, "Tea has been a popular beverage since antiquity, with records referring to consumption dating back to the dynasty of Shen Nong (approximately 2700 BC) in China." They went on to say that drinking tea has become increasingly popular in western countries today.

The study was led by Research Assistant Professor Feng Lei, of the National University of Singapore School of Medicine, with collaborators from the University of Essex and University of Cambridge.

Editor's Note: "Our results offer the first evidence of positive contribution of tea drinking to brain structure and suggest that drinking tea regularly has a protective effect against age-related decline in brain organization," said Dr. Feng Lei.

\* Aging (Albany NY). 2019 Jun 14;11(11): 3876-3890.

#### **Blueberry Intake May Reduce Cardiovascular Disease Risk**

A study reported in the American Journal of Clinical Nutrition found a lower risk of cardiovascular disease among men and women with metabolic syndrome who consumed the equivalent of a cup of blueberries daily for six months.\*

A total of 138 participants were randomized to groups that received 26 grams of powdered blueberries (equivalent to a cup of fresh blueberries), 13 grams of powdered blueberries plus ½ cup of a mock blueberry placebo, or 26 grams of the placebo.

Insulin resistance, flow mediated dilatation (a measure of endothelial function), augmentation index (which measures arterial stiffness), cholesterol, and other factors were measured before and after the intervention.

The researchers observed an improvement in endothelial function and arterial stiffness in the group that received 26 grams of blueberry powder.

Editor's Note: "The simple and attainable message to consume one cup of blueberries daily should be given to those aiming to improve their cardiovascular health," the authors concluded.

\* Am J Clin Nutr. 2019 Jun 1;109(6):1535-1545.





#### 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.





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- 4. **Astaxanthin** for comprehensive eye health support and to fight eye fatigue.<sup>9</sup>
- 5. Saffron to help support vision, based on study subjects seeing an average of two additional lines on eye chart used by doctors to test vision.<sup>1</sup>



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# Boost Nitric Oxide to Reduce Cardiovascular RISK

BY JACOB ROSE

**Nitric oxide** is a substance your body naturally produces.

It signals blood vessels to widen, allowing blood to flow through freely.

But nitric oxide production decreases with age.1

This contributes to **endothelial dysfunction** that leads to the initiation and progression of arterial disease.<sup>2-5</sup>

The consequences of **endothelial dysfunction** are:

- 1. Diminished circulation
- 2. High blood pressure
- 3. Thrombosis (clots inside blood vessels)
- 4. Atherosclerosis

These are major causes of stroke and heart attack.<sup>5-8</sup>

We can't get **nitric oxide** directly from diet or supplements.

The good news is that **L-arginine** and **aronia** berries help the body make more of it.



#### **Endothelial Dysfunction and** Cardiovascular Disease

The endothelium is the inner lining of blood vessels, and it plays a critical role in regulating the flow of blood.2-4

It does this by producing nitric oxide, which signals blood vessels to dilate (widen). That allows greater blood flow to tissues, including the heart and brain.

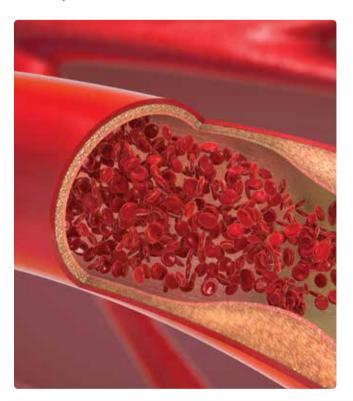
But as we age, our body makes less nitric oxide.1 That can lead to **endothelial** dvsfunction, which means the blood vessels are unable to dilate and constrict as needed, reducing blood flow.2-4

This condition, referred to as arterial stiffness, contributes to high blood pressure, formation of atherosclerotic plaque, and inflammation in the arteries—all of which can lead to cardiovascular disease.9

It also greatly increases the risk of abnormal clotting, which can block blood vessels, leading to heart attack. stroke, and sudden cardiac death. 10,11

**Endothelial dysfunction** is surprisingly common; one study showed it affected about one third of people without any prior history of cardiovascular disease. 12 The elderly, diabetics, the obese, smokers, people with cardiovascular disease, and those with high cholesterol or high blood pressure have a higher risk.2-4

But if we can increase the amount of nitric oxide in our blood vessels, it may stop, and even reverse endothelial dysfunction.



#### **How L-Arginine Helps**

Unfortunately, we can't simply take nitric oxide as a supplement. It has an extremely short half-life, which means it's too quickly metabolized and eliminated from the bloodstream to be useful.

To work properly, blood vessels must make nitric oxide for themselves. To do so, they need a precursor compound. This precursor is an amino acid called L-arginine.

Aware of this link between L-arginine and nitric oxide production, researchers evaluated whether increasing intake of L-arginine improves blood vessel dilation, lowering risk for disease. 13-17

One of the main ways to test this is to measure how much a blood vessel widens in response to an increase in blood flow, something called **flow-mediated dilation**.

In a landmark clinical trial published in the International Journal of Cardiology, scientists gave patients with high blood pressure a single dose of either L-arginine or a placebo. 15 While the placebo group had no change in their blood vessel function, those receiving L-arginine had an improvement in their flow-mediated dilation from an average of 1.7% to 5.9%.

Considering that each 1% improvement in flowmediated dilation correlates with a 12% lower risk of cardiovascular events like heart attacks and strokes. 18,19 this would suggest a 50% reduction in risk of cardiovascular events if the effect is sustained over time.

Other longer-term clinical studies have shown that taking L-arginine can lower blood pressure and reduce symptoms associated with coronary artery disease. 16,20

#### A New, Better Form of L-Arginine

Life Extension® has written about L-arginine for the past 38 years. But in the last few years, scientists have developed and tested a new form.

Known as inositol-stabilized arginine silicate, this novel form is more bioavailable, which means more of it is absorbed into the bloodstream after ingestion.

Studies show that L-arginine blood levels increase within one hour after supplementation with inositolstabilized arginine silicate and stay there for many hours. 21,22

It appears to do this by inhibiting the enzyme arginase, which breaks down L-arginine in the digestive tract, allowing more of the L-arginine to enter and circulate in the blood longer.23



#### **Aronia Berry Improves Endothelial Function**

Aronia berries are small, dark purple berries native to North America. They're high in anthocyanins, beneficial polyphenols.

Scientists discovered that like L-arginine, aronia can improve endothelial function.

While L-arginine provides the *precursor* needed to form nitric oxide, polyphenols from aronia berries appear to increase the activity of the enzyme that converts the L-arginine into nitric oxide.

It does this by inducing the modification of the enzyme, called endothelial nitric oxide synthase, in a way that turns the enzyme "on."24

In one randomized, controlled trial, daily supplementation with 500 mg of aronia whole fruit berry for 12 weeks resulted in improved flow-mediated dilation.<sup>25</sup> Subjects taking the aronia had a 0.9% improvement in flow-mediated dilation compared to those taking a placebo.

That may sound small, but bear in mind that each 1% improvement in flow-mediated dilation correlates with a 12% lower risk of cardiovascular events, 18,19 suggesting that this corresponds to a nearly 11% reduction in risk for cardiovascular events.

The enhanced bioavailability of inositol-stabilized arginine silicate coupled with the increased endothelial nitric oxide synthase activity from aronia berries make this a potent duo in the production of nitric oxide.

- The endothelium is a layer of cells lining the inside of blood vessels. It produces nitric oxide, a gas that signals the vessel to dilate, allowing blood to flow through and preventing abnormal clotting.
- With age and other risk factors, nitric oxide production declines, contributing to endothelial dysfunction. This increases risk for the development of cardiovascular disease events, including heart attack and stroke.
- **L-arginine** is a precursor the body needs to make nitric oxide. A new form, inositol-stabilized arginine silicate, improves its bioavailability and supports higher levels in the bloodstream for a longer time.
- Aronia berries help activate the enzyme that converts L-arginine into nitric oxide.
- These two ingredients work to boost nitric oxide production, helping blood vessels dilate more efficiently. This may significantly reduce risk for heart attack, stroke, and other cardiovascular events.

#### **Summary**

Our bodies produce **nitric oxide**, which signals blood vessels to dilate. With age, its production declines, contributing to **endothelial dysfunction**.

Endothelial dysfunction increases the risk of **cardio-vascular disease**, including heart attacks and strokes.

Two ingredients, **L-arginine** and **aronia berries**, boost the body's production of nitric oxide.

Human studies show that they improve the **flow of blood** through the vessels, which can reduce the risk for cardiovascular disease. •

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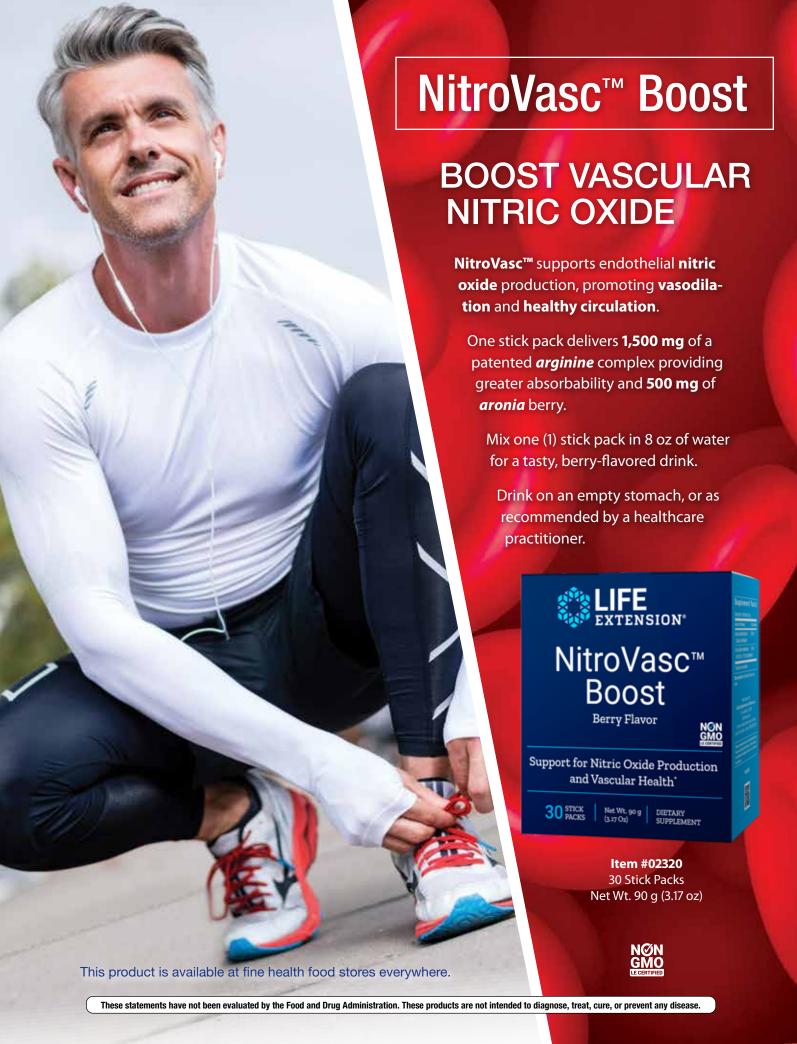
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# ProbioticPhage Blend Fights Digestive Problems and Boosts Immune Defenses

Gas. Bloating. Stomach pain. Diarrhea.

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

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

An underlying cause of many of these conditions is an imbalance of good to bad **bacteria** in our gut.<sup>3-5</sup>

Health-conscious people know the value of taking a quality **probiotic**. These health-promoting 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 **probiotics** 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.<sup>6,7</sup>

**Bacteriophages** are tiny packages of DNA or RNA wrapped in protein that seek out and *selectively eliminate only harmful bacteria*.<sup>8</sup> 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 four 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 one dish.6

Five hours later, there was little growth of *B. longum* in the dish without 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 decrease in *E. coli* in the small intestine.
- About a 100-fold decrease in *E. coli* in the large intestine, and
- About a 100-fold decrease in *E. coli* in fecal matter.

The phage-treated group also had:7

- About a 100-fold increase in B. longum in the small intestine,
- About a 100-fold increase in B. longum in the large intestine, and
- About a 40-fold increase 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.<sup>4,5</sup>

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. •



#### 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.<sup>42</sup> 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.<sup>47</sup> 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 two 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.



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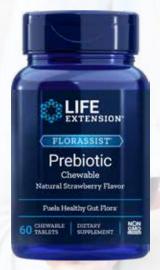
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## Maintain a Healthy Post-Inflammatory Response

#### **PRO-RESOLVING MEDIATORS**







#### **Common Causes of Digestive Problems**

Many health problems plaguing aging adults, including digestive discomfort like gas and diarrhea, impaired immunity, and nutritional deficiencies, can often be attributed to poor digestion.

Two important causes of digestive problems are:1-5

- 1. Age-related declines in production of endogenous digestive enzymes, and
- 2. Imbalances in the gut microbiota.

Digestive enzymes are needed to break down the foods we eat and extract essential nutrients from them. And a proper balance of bacteria must be present in the gut to prevent bloating, gas, and other unpleasant digestive symptoms.

Drugs such as Alka-Seltzer® and Pepto-Bismol® can temporarily relieve some symptoms but do nothing to address the underlying problem.

#### The Power of Digestive Enzymes

To help break down food more completely by the time it reaches the end of our small intestine, substantial amounts of all required digestive enzymes are needed.

This helps prevent undigested food from passing into the colon and causing gastrointestinal problems.

About 70 years ago, scientists first discovered<sup>6</sup> that taking digestive enzymes orally leads to more complete

digestion of foods in the stomach. Since then, studies have validated the beneficial effects of digestive enzyme supplementation.7-9

Optimal digestion of major food types, including proteins, fats, dairy, and plant cellulose (fiber), requires different digestive enzymes, such as:

- Protease,
- Lipase,
- Lactase,
- Cellulase, and
- Bromelain.

#### The Challenge of Plant-Based Diets

In recent years, diets have changed. More people are reducing their meat and other animal-derived food intake and increasing their intake of plant-based foods.

The cell walls of these foods contain complex polysaccharides and fibers. While fiber is an important part of a healthy diet, it may also bind to minerals and other nutrients, blocking their bioavailability and preventing their absorption.

Humans do not produce the enzymes required to break down fiber and depend on enzymes produced by intestinal microorganisms. 10,11



Protease 3.0 is an enhanced form of the protease enzyme that helps digest gliadin found in wheat.

To properly break down other plant-based foods requires:

- Alpha-galactosidase,
- Hemicellulase,
- Cellulase,
- Xylanase, and
- Pectinase.

#### **General Purpose Enzymes**

The enzymes described next have long been used to improve digestion. Each has a specific, targeted function that helps break down complex foods into nutrient components that can be readily absorbed.

#### **Protease**

Protease breaks down proteins. Research shows that giving protease to animals enhances their digestion.12

Aging individuals may receive tremendous potential benefits from supplementing with protease enzymes in order to increase the efficiency of protein digestion.

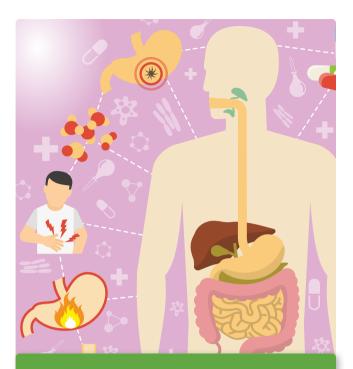
#### Lactase

Lactase breaks down lactose, or milk sugar. Older people are often deficient in this enzyme, 13 resulting in cramps, bloating, gas, and diarrhea after consuming dairy products.<sup>14</sup> But avoiding dairy can cause calcium deficiency, increasing the risk of osteoporosis and bone fractures.15-18

Studies show that taking lactase reduces or eliminates post-meal abdominal cramping, belching, flatulence, bloating, and diarrhea in people with lactase insufficiency. It also promotes better overall nutrition.<sup>19</sup>

#### Lipase

Lipase breaks down fat into individual fatty acids and related substances. It helps the body absorb vital fat-soluble nutrients, such as omega-3 fatty acids. carotenoids like lycopene and lutein, and vitamins A, D, K, and E.20



#### WHAT YOU NEED TO KNOW

#### **Boost Digestion**

- Poor digestion can result in bloating, gas, and discomfort, and compromises the absorption of key nutrients.
- Digestive problems can be caused by an age-related decline in digestive enzymes and an imbalance in the all-important gut microbial ecosystem.
- Increasing your intake of plant-based foods creates special challenges to your digestion but special enzymes that specifically target these high-fiber foods can help your body better handle a plantbased diet.
- Digestive enzymes can help break down and digest food while preventing gastrointestinal distress and promoting better overall health.
- Adding Bacillus coagulans to a broad range of digestive enzymes may provide protection against several gastrointestinal discomforts.

Without sufficient lipase, incompletely digested fats can cause greasy, fatty stools and cramping. Inadequate fat digestion also blocks absorption of key vitamins, leading to deficiencies.

Taking oral lipase promotes fat digestion.<sup>21,22</sup> In one study, pancreatic lipase enzymes were given to subjects eating a high-fat meal, resulting in significant reductions in bloating and gas.<sup>22</sup>

#### **Bromelain**

**Bromelain** is extracted from pineapple stem and fruit. It helps with digestion of proteins. 23,25

Scientists studied adults with an inability to fully digest and absorb fats and proteins. Taking an enzyme mix containing bromelain improved digestion and absorption of both these food groups.<sup>25</sup>

#### **Digestive Enzymes to** Support *Plant-Based* Diets

The enzymes described so far support basic digestion. But the trend toward plant-based foods means additional enzymes can help improve the breakdown of hard-to-digest types of plant fibers.

The following digestive enzymes deliver potent support for high-fiber, plant-based diets.

#### Protease 3.0

Traditional protease breaks down most proteins. But a specialized protease known as protease 3.0 is even

better at promoting the digestion of proteins in acidic conditions such as those found in the stomach.

This enzyme may also help some people with gluten sensitivity or intolerance since it specifically promotes digestion of gliadin, a protein found in gluten in wheat, and some other grains.

#### Alpha-Galactosidase

Alpha-galactosidase is a digestive enzyme that breaks down oligosaccharides, carbohydrates found in plant foods including beans and cruciferous vegetables (such as cauliflower, broccoli, and cabbage).

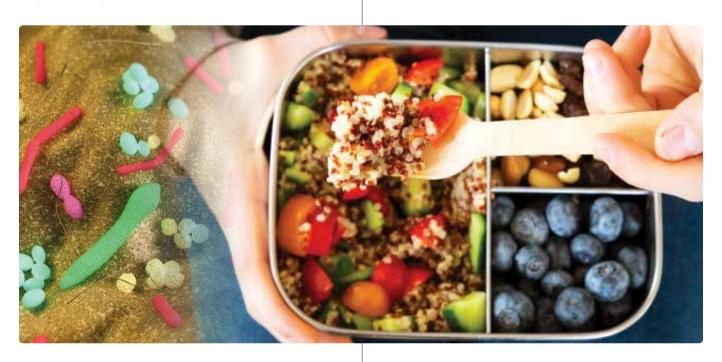
Taking this enzyme substantially reduces bloating. discomfort, and flatulence associated with eating these foods. 26,27

In one study, scientists recruited volunteers with irritable bowel syndrome (IBS). For three days they ate a diet high in a type of oligosaccharide that triggers IBS symptoms. The group that took oral alpha-galactosidase had a clinically significant reduction in gastrointestinal symptoms compared to a placebo group.28

#### Cellulase

**Cellulase** is not produced naturally in the human body. It allows humans to digest most cellulose, or plant fiber.

This allows for smoother digestion of tough vegetable fiber and minimizes the excessive flatulence that deters many people from eating healthy, high-fiber foods like broccoli and beans.





#### Hemicellulase, Xylanase, and Pectinase

Additional digestive support is found in three enzymes specific for the breakdown of plant foods high in **fiber**:

- Hemicellulase breaks down hemicellulose, a complex carbohydrate that is a major component of cell walls in plants.
- **Xylanase** breaks down **xylan**, another complex sugar found in plant cell walls. When undigested, xylan can impair nutrient absorption.29
- Pectinase breaks down pectin, a naturally occurring substance found in pears, apples, guavas, plums, oranges, and other fruits.

An optimal selection of enzymes should include:

 The full range of traditional digestive enzymes, and additional enzymes that target high-fiber and gas-producing plant foods.

#### A Probiotic for Digestive Health

Even greater digestive health is possible with the addition of a targeted probiotic.

Probiotics are microorganisms that, taken in adequate amounts, have a health benefit. Like enzymes, they are vital to the digestion process.

One particular probiotic, **Bacillus coagulans** strain MTCC 5856, has been shown to effectively treat both constipation and diarrhea, along with other symptoms of irritable bowel syndrome. 30,31

In a double-blind, placebo-controlled study, patients with irritable bowel syndrome took tablets containing 2 billion spores of Bacillus coagulans strain MTCC 5856 daily. This led to a significant decrease in bloating, vomiting, diarrhea, abdominal pain and discomfort, and stool frequency.31

Addition of this probiotic strain to a broad range of digestive enzymes may provide comprehensive protection against several types of gastrointestinal discomfort.

#### Summary

As we age, the levels of **digestive enzymes** in our bodies decline. This triggers digestive problems, including bloating, gas, and diarrhea, and prevents absorption of nutrients.

The recent shift toward eating more plant-based foods can increase this problem, because the increased amount of difficult-to-digest plant fiber components requires specialized enzymes.

Digestive enzymes can boost the body's ability to fully break down food and may prevent gastrointestinal distress and promote better overall health.

Addition of the probiotic Bacillus coagulans to a broad range of digestive enzymes may provide a high level of protection against several gastrointestinal discomforts. •



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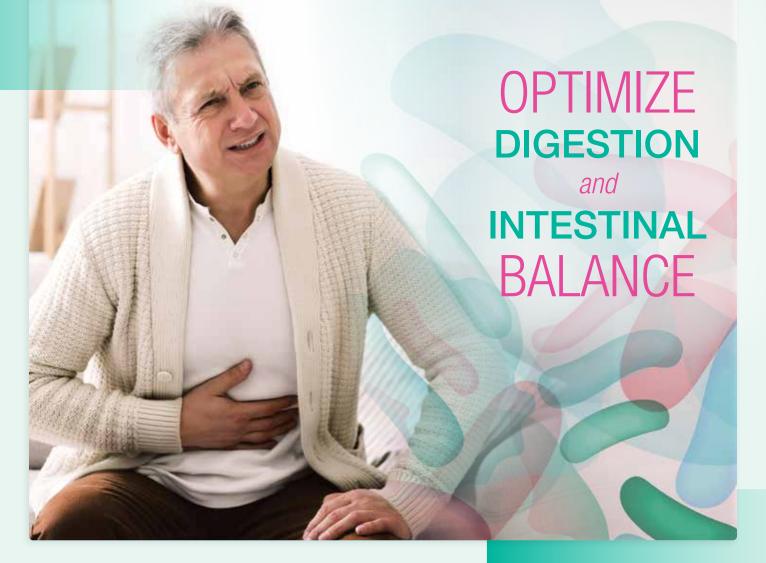
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### COLLAGEN PEPTIDES Reverse Skin Aging from the Inside

BY MICHAEL DOWNEY

As we age, our skin loses two natural compounds that keep it smooth, moisturized, and youthful looking:

- 1. Collagen and
- 2. Hyaluronic acid.<sup>1,2</sup>

The loss of these skin components leads to wrinkles, sagging, and dryness. 1,2

But there's a way to prevent and even reverse these changes. Scientists have clinically demonstrated that:

- Oral use of a collagen peptide improves skin elasticity by an average of 7%<sup>3</sup> and reduces the volume of eye wrinkles by 20%.4
- Oral use of hyaluronic acid significantly increases skin moisture in those with chronically dry, rough skin after just 3-6 weeks.1

Researchers have now devised a way to deliver clinically effective doses of these two nutrients together in a tasty, fruit-flavored gummy. Working from the inside out, they can rejuvenate the skin and return it to optimal health.

#### Collagen Keeps Skin Youthful

The word **collagen** comes from the Greek *kola*, "glue." Essentially, collagen—the most abundant **protein** in the human body—is the glue that holds the entire body together.

It's the main component of most connective tissues, like tendons and muscle, and makes up **70**% of the inner layer of skin by weight.<sup>5,6</sup>

Collagen provides strength and resilience and is integrated with **elastin** fibers, the protein that gives skin flexibility and elasticity. Elastin allows the skin to return to its original shape after it's been stretched.<sup>7</sup>

But collagen production begins to decline around age **25**. The cells that produce collagen fibers slow down, and the remaining fibers can stiffen, break, and lose proper shape over time. Elastin fibers also begin to fray and lose elasticity.

It is no coincidence that visible skin aging occurs in many people around **age 25**, which is when **collagen production** begins to drop.

Adults lose about **1%** of their skin collagen *each year*.<sup>8</sup> While this may not seem like a lot, after several decades, we may have lost **half** the skin collagen we had at age **18**.<sup>8,9</sup>

This decline accelerates faster in women after **menopause**. Factors such as smoking, high blood sugar, and sun exposure also decrease collagen levels.<sup>10-14</sup>

Reduced collagen production has a devastating effect on the skin, resulting in thinning, sagging, and wrinkles.<sup>8,9</sup>

To solve this problem, scientists developed **collagen peptides** that provide the building blocks for collagen.

Taken orally, they stimulate the production of *new* collagen and elastin in the skin. This leads to increased suppleness and elasticity and **reduces wrinkles**.<sup>4</sup>

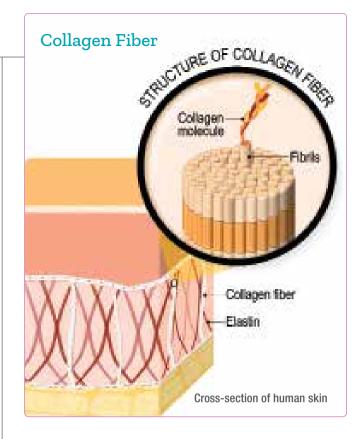
#### Oral Collagen Research

In animal studies, scientists showed that *hydrolyzed* (or partially broken-down) **collagen peptides** *boosted* the creation and activity of collagen.<sup>15</sup> This produces stronger, more supple skin.

Collagen peptides also *decreased* the activity of a "protein-melting" enzyme (*matrix metalloproteinase 2*) that degrades collagen and hastens skin aging.<sup>15</sup>

**Human trials** have now demonstrated that an oral collagen peptide is clinically effective in improving skin appearance.<sup>3,4</sup>

Scientists evaluated the effectiveness of collagen peptides on **skin elasticity**. One group of volunteers



received **2.5 grams** of oral collagen daily, one received **5 grams** daily, and a third received a placebo.<sup>3</sup>

After eight weeks, both groups taking the oral **collagen** had an average **7% improvement** in skin elasticity. Remarkably, those subjects retained higher elasticity than the placebo group even four weeks *after* the last dose. The improvement in skin elasticity was found to be *greater* in **women** over age 49.<sup>3</sup>

Next, researchers tested collagen on *skin wrinkles*. In a double-blind, placebo-controlled trial, they gave oral collagen peptides to 114 women, aged 45 to 65, in daily doses of **2.5 grams**.<sup>4</sup>

#### **Results from Human Study**

After four weeks, the volume of eye wrinkles for the collagen group had decreased by **7.2%**, compared with placebo recipients. After the full eight-week trial, those taking oral collagen peptides showed a stunning **20.1% reduction** in the size of eye wrinkles.<sup>4</sup>

In the same trial, scientists studied how **collagen peptides** affected the **synthesis of the dermal matrix**, the structural framework responsible for skin renewal and vitality. They did so by measuring structural proteins in the matrix. The more proteins, the healthier and more youthful the skin appears.<sup>4</sup>

The study found that subjects taking collagen had a 65% increase in essential type-I pro-collagen and an 18% increase in elastin fibers.<sup>4</sup>

#### **Hyaluronic Acid Moisturizes Skin**

Hyaluronic acid is equally critical for maintaining and restoring youthful-looking skin.

It's a carbohydrate present in most body tissues. More than 50% of it is found in the skin, where it helps hold in moisture. 1,16 In fact, hyaluronic acid can hold up to 1,000 times its weight in water.17

Hyaluronic acid is an essential part of the extracellular matrix, a network that provides structural integrity and cohesion to skin.<sup>18</sup> It supports skin hydration,<sup>19</sup> stimulates synthesis of collagen and elastin, 20-22 promotes tissue repair,23-26 and combats the effects of ultraviolet radiation.26

In other words, the skin needs hyaluronic acid to maintain a healthy and youthful appearance.

But the body produces less of it as we age. This problem is worsened by environmental stress, particularly chronic sun exposure.<sup>27-30</sup> The result is wrinkling, dryness, and sagging.

In a dramatic finding, however, scientists have demonstrated that oral hyaluronic acid can slow-and even reverse—these effects.



#### Oral Hyaluronic Acid Rehydrates Skin

Scientists conducted an in-depth analysis of several previous studies of hyaluronic acid. In most, volunteers had been diagnosed with "chronically rough and dry skin," which was not substantially improved by moisturizers or other treatments.1

But hyaluronic acid made a radical difference. Compared to volunteers who received a placebo, those taking oral hyaluronic acid had a significant increase in skin moisture after just three to six weeks. And the moisturizing effects continued for a full two weeks after they stopped taking it.1

Hyaluronic acid also reduced itching that comes with dry skin.1

#### WHAT YOU NEED TO KNOW

#### Get Healthier, Younger-Looking Skin

- Collagen and hyaluronic acid are two nutrients vital to the health and youthful appearance of our skin. The body produces less of them as we age, causing wrinkling, sagging, and dryness.
- Taking oral collagen peptides spurs the synthesis of new collagen, improving skin elasticity, boosting essential structural proteins, and reducing the size of eye wrinkles by as much as 20%.
- Hyaluronic acid taken orally has been shown to reverse the loss of moisture in aging skin, effectively treating dry, itchy skin and helping to restore a more youthful appearance.
- Taking these two nutrients together at clinically effective doses can lead to healthier, smoother, and younger-looking skin.



In fact, the scientists concluded that skin dryness is caused by a decrease in hyaluronic acid due to aging, sun exposure, smoking, and other factors. Their study found that hyaluronic acid safely and effectively moisturizes the skin and improves its health.<sup>1</sup>

You can now orally replenish the skin's diminishing supplies of both collagen *and* hyaluronic acid. These two nutrients have been shown to:

- Increase skin moisture,
- Improve elasticity,
- Decrease wrinkle depth,
- Boost levels of the skin's structural proteins, and
- Provide more youthful-looking skin.

#### Summary

**Collagen** and **hyaluronic acid** keep our skin smooth, supple, moisturized and youthful looking. But, as we age, we lose both these nutrients.

Taking **oral collagen peptides** boosts the synthesis of *new* collagen in the skin. That improves skin structure and elasticity, reduces eye wrinkle depth up to **20%**, and increases levels of proteins that provide strength and resilience to the **dermal matrix**.

**Oral hyaluronic acid** also protects and nourishes skin by boosting moisture content. That can help treat dry, itchy skin, and make it healthier and younger looking.

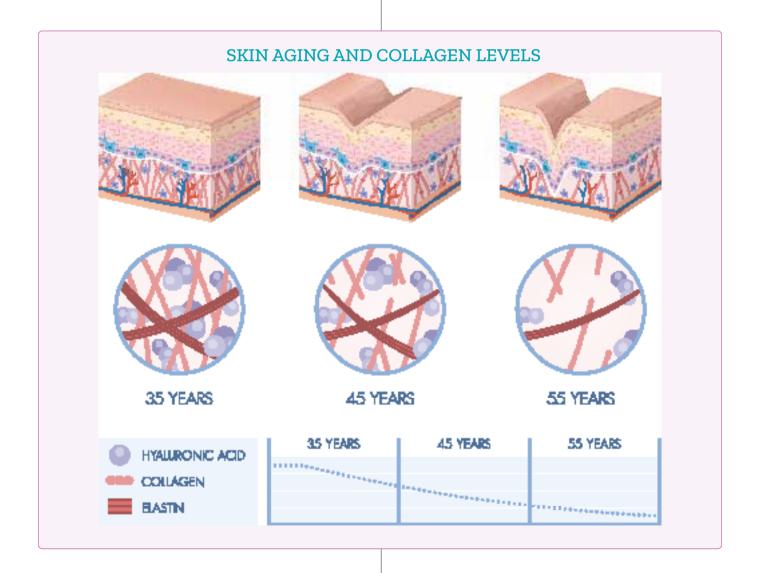
Both of these nutrients can now be taken together in clinically effective doses, quickly providing noticeable improvements in the appearance of aging skin. •

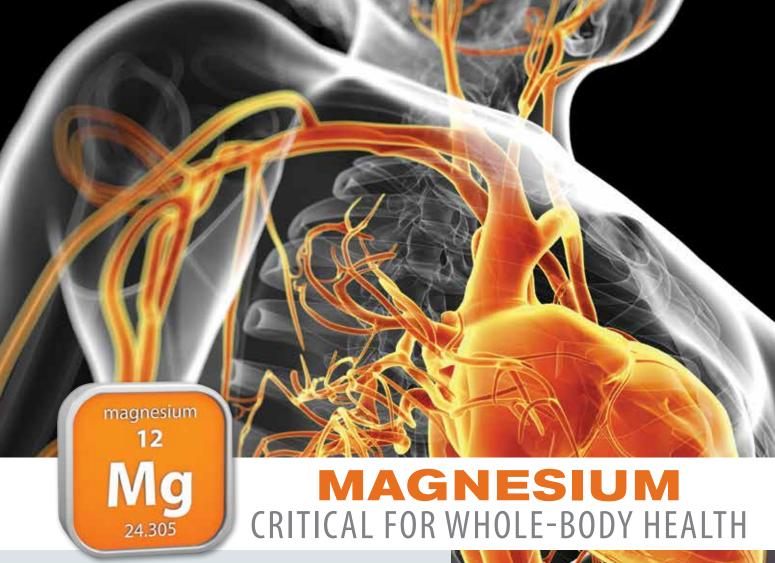
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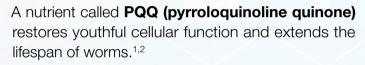
References: 1. Skin Pharmacol Physiol. 2014;27(3):113-9. 2. Skin Pharmacol Physiol. 2014;27(1):47-55.





## How PQQ Slows Aging

BY JANICE HAMILTON



PQQ helps **mitochondria**—the "powerhouses" of the cell—work more efficiently.

It also promotes formation of *new* mitochondria in aging cells. Dysfunctional mitochondria contribute to body-wide degeneration.<sup>2-9</sup>

But it turns out PQQ does much more.

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 healthspan 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%.<sup>1,2</sup>

#### **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.<sup>10</sup>

#### 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.<sup>10</sup>

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, insufficient 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.<sup>19</sup>

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.<sup>24,25</sup>

#### 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.**<sup>33,34</sup>

By helping mitochondria perform more efficiently and by promoting the development of *new* mitochondria, PQQ may help prevent these diseases.<sup>23,35,36</sup>

Studies in rats show that increasing PQQ can *minimize brain injury* induced by rotenone, a neurotoxin that causes Parkinson's-like symptoms.<sup>36</sup> 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.<sup>37</sup> Excitotoxicity occurs when nerve cells are damaged or killed by overactivity of the neurotransmitter **glutamate**.<sup>38</sup>

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

#### **Extending Lifespan**

When **senescent** cells accumulate, it accelerates aging processes.<sup>12</sup> 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.<sup>1,2</sup>

#### **Summary**

PQQ (pyrrologuinoline 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. •

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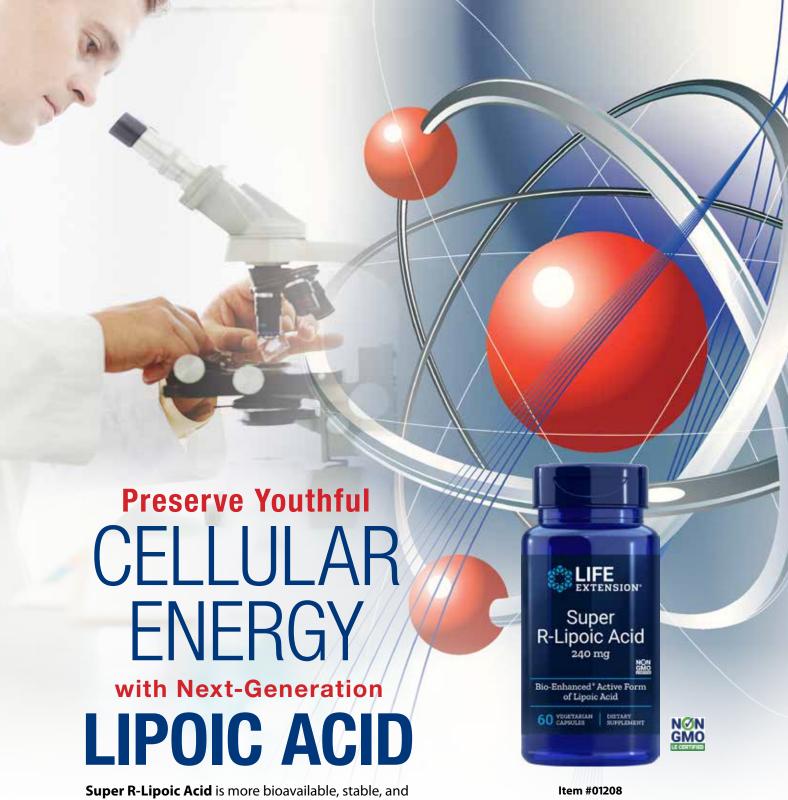
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Also available are 10 mg PQQ caps (Item #01500) and 100 mg Super Ubiquniol CoQ10 with PQQ (Item #01733).

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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.<sup>1</sup>

Ingestion of blueberry polyphenols may decrease the risk for cognitive decline,<sup>2,3</sup> cancer,<sup>4,5</sup> and heart disease.<sup>6,7</sup>

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 atherosclerosis, which is the buildup of fatty deposits (plague) 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.<sup>9,10</sup>

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 central role in the inflammation that drives this process.<sup>11</sup>

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.<sup>16-18</sup>

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.<sup>22</sup>

#### 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. <sup>23</sup>

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. •

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# DAILY

### ARTERIAL PROTECT

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Item #01918 • 60 mg • 30 vegetarian capsules

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# Blueberry

**Blueberries** provide health-boosting benefits shown to:

- · Enhance heart health
- Maintain brain function
- Promote blood-sugar levels already within normal range
- · Support smooth, firm skin
- Maintain healthy movement and coordination

This product is available at fine health food stores everywhere.

Blueberry extract is more potent than the whole berry, providing greater metabolic support throughout the body and without the excess sugar of raw fruit.

Item #01214

60 vegetarian capsules









#### 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.<sup>2</sup>

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%**.<sup>3</sup>

The increase in medical costs due to obesity are around **\$3,429** per obese person per year.<sup>4</sup> 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.<sup>3</sup>

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**.<sup>5-7</sup>

Obesity has been determined to be the underlying cause of approximately **20%** of deaths in the United States.<sup>8</sup>

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.<sup>9</sup>

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.<sup>11,12</sup>

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."<sup>10</sup>



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.<sup>12</sup>

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.<sup>13</sup>

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.**<sup>11</sup>

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%** increased risk for all-cause mortality. For each additional serving, this risk increased by **18%**. <sup>14</sup>

# 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.<sup>15</sup>

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

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. <sup>15,16</sup>

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.<sup>15,16</sup>

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.<sup>17</sup>

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

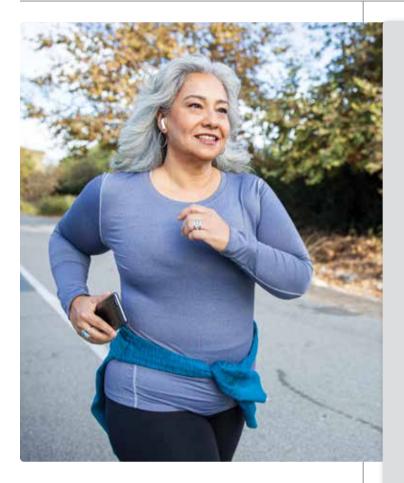
It is a commonly held belief that as long you're not obese you can be overweight and still be healthy. This is not always true. Studies have shown significant dangers associated with being overweight compared to a normal weight.

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.<sup>19</sup>

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.<sup>20</sup>

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. 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.<sup>22,23</sup>
- 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.<sup>24,25</sup>
- Excess weight promotes osteoarthritis as a result of both increased wear and tear, and because of increased chronic inflammation.<sup>26</sup>
- 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.<sup>27</sup>
- 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.<sup>28</sup>
- Excess weight makes it more difficult to absorb vitamin D and other fat-soluble vitamins.<sup>29</sup>

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

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.<sup>21</sup>

# **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

Activated 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. •



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People who struggle with weight management often point to several "Achilles' heels" that sabotage their efforts to keep the pounds off: eating between meals, grazing at night, and a constant desire to snack are among the most common.

The fantastic news is that a proprietary extract of **saffron**, called **Satiereal**®, is *scientifically* proven to deal with nearly all these issues. In fact, women involved in **Satiereal**® studies experienced the following:<sup>1,2</sup>

- 100% reduction in the desire to snack
- 55% fewer instances of eating between meals
- Less hunger
- Moderate weight loss
- More energy
- Better mood

Say goodbye to "kitchen raids" and say hello to **Optimized Saffron with Satiereal**®.

#### Item #01432

60 vegetarian capsules

#### References

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

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



This product is available at fine health food stores everywhere.



# Increase AMPK to Better Manage Body Weight

Most people today consume too many excess calories.

This results in **mTOR** constantly running at high gear, which is a factor in unwanted **fat storage**.

Studies show that <u>increasing</u> **AMPK** activity turns down excess **mTOR**.<sup>1</sup>

# **Reduce Cell Fat Storage**

Scientific studies show that <u>increasing</u> **AMPK** activity can encourage cells to store less fat and burn it as energy.<sup>2,3</sup>

**AMPK Metabolic Activator** was formulated based on data showing <u>reduced</u> **belly fat** in response to just one of its ingredients (*Gynostemma pentaphyllum*).<sup>3</sup>

**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.



Item #02207

30 vegetarian tablets



This product is available at fine health food stores everywhere.

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

# Dietary Supplement of Year 2020

6.941 [HE]2s<sup>1</sup> 3

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

# Lithium



# **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:<sup>1-13</sup>

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

- 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
- 8. Combined with two other compounds, **lithium** extended fruit fly lifespan by an average of **48%**.





# Rapamycin<sup>1</sup> + Senolytic<sup>2</sup> + Lithium<sup>3</sup>

= 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.<sup>10</sup>



# 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 no 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.

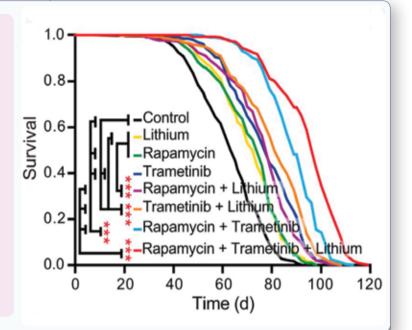
The three slides in this article are from Power Point presentations I give to live audiences, suggesting that they supplement with lithium, which up until now, no one seemed to offer in what may be an ideal potency. •

# PNAS - September 30, 2019

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

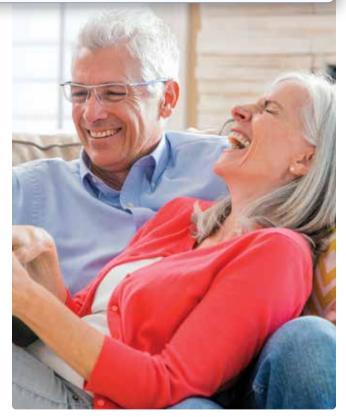
...so we found it was quite remarkable that this drug combination enabled them to live 48% longer."

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

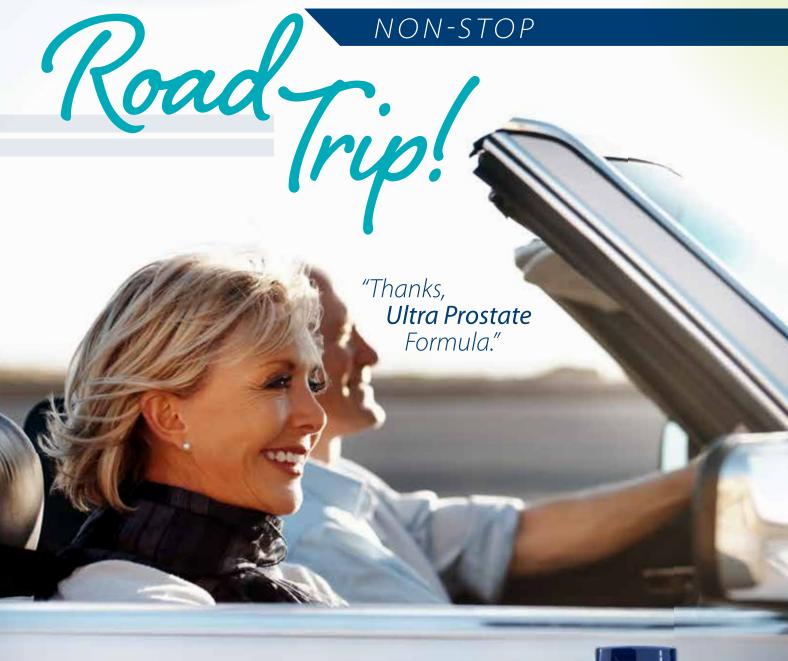


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# Ultra Prostate Formula can help:

- Support healthy urination
- Promote healthy prostate size and function
- Encourage a heathy inflammatory response
- Help inhibit PSA activity

This product is available at fine health food stores everywhere.



Item #02029 • 60 softgels





**B**, providing a full spectrum of liver-supportive compounds.

The **silymarin** contained in **Advanced Milk Thistle** is absorbed nearly 5 times better than silymarin alone, and its bioavailability to the liver is 10 times better.



Item #01922 60 softgels

This product is available at fine health food stores everywhere.

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

# LITHIUM

# Brain & Body

In areas where **lithium** is naturally abundant in the drinking water, people tend to **live longer**, healthier lives.<sup>1-3</sup>

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

Lithium Orotate
(1000 mcg of lithium per capsule)
Item # 02403

100 Vegetarian Capsules

This product is available at fine health food stores everywhere.

#### 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.





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



# Hemp Seeds

BY LAURIE MATHENA

Hemp seeds, with their mild, nutty flavor, have been used in China for more than 3,000 years, as both food and medicine.

More recently, hemp seeds (also called hemp hearts) have experienced a resurgence in the West because of their unique nutrient profile, which boasts an abundance of protein, healthy fats, and minerals.

## A Top Source of **Plant-Based Protein**

About 25% of the total calories in hemp seeds are from protein. Just two to three tablespoons of the seeds provide about 11 grams of protein.1

In addition, hemp seeds are considered a complete protein source, meaning they contain all nine essential amino acids.

# **Reduces Heart Disease Risk**

Hemp seed consumption can help reduce the risk of heart disease. Animal studies have shown that hemp seeds can lower blood pressure,2 decrease cholesterolinduced platelet aggregation,3 and help the heart recover after a heart attack.4

## **Improves Skin Health**

Dietary hemp seed oil has been shown to help improve clinical symptoms in patients with atopic dermatitis.5 Researchers attributed these improvements to the abundance of polyunsaturated fatty acids found in hemp seed oil, which include both omega-3 and omega-6 fats.



According to Life Extension®, the optimal ratio of omega-6 to omega-3 consumption is about 4 to 1. In fact, hemp seeds boast a 3

You can enjoy hemp seeds sprinkled on salads, in smoothies, or as a topping on oatmeal.

#### References

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- 3. Can J Physiol Pharmacol. 2008 Apr;86(4):153-9.
- 4. Am J Physiol Regul Integr Comp Physiol. 2007 Mar;292(3):R1198-203.
- 5. J Dermatolog Treat. 2005 Apr;16(2):87-94.





Item #02403

# **New Low-Dose Lithium Supports Brain Health & Longevity**

A healthy brain naturally creates certain types of proteins. These proteins can affect cognition and memory—so your brain has built-in processes for removing them.1 But this clearing process declines as part of normal aging. When that happens, these proteins can begin to accumulate.2

Preclinical studies indicate that lithium helps support the breakdown of these accumulated brain proteins, promotes the brain's normal process for clearing cellular debris from your brain cells and helps maintain already-healthy brain glucose metabolism.3-5

Lithium also helps protect your brain's neurons, and some evidence suggests that lithium may help maintain DNA health, circadian rhythms and even longevity. This supplement contains 1000 mcg-or 1 milligram-of this health-promoting nutrient.6-9

#### References:

- 1. Neurotox Res. 2018;34(3):733-748.
- 2. Pathol Int. 2017;67(4):185-193.
- 3. ACS Chem Neurosci. 2014;5(6):434-42.
- Pharmacol Ther. 2010;128(2):281-304.
   Prog Neurobiol. 2013;108:21-43.
- 6. Eur Neuropsychopharmacol. 2016;26(7):1241-7.
- 7. European journal of nutrition. 2011;50(5):387-389.
- 8. Curr Psychiatry Rep. 2019;21(3):14.
- 9. Aging cell. 2004;3(5):309-317.



Item #02125

# Our Best in Class FLORASSIST® Probiotic Just Got Better

Formula Update: FLORASSIST® GI with Phage Technology targets unwanted bacteria with a novel bacteriophage blend, while delivering a proprietary blend of healthy probiotic strains to promote digestive health at the same time. Now, we've improved our formula, honing the probiotic blend to work more synergistically with the bacteriophages. The result: a better, more effective probiotic for daily digestive health support.





Item #02021

Item #02022

# Our Digestive Enzymes Formulas Make It Easy to Follow a Plant-Based Diet

Formula Update: Research has shown that supplementing with digestive enzymes can promote optimal digestion and absorption of nutrients from the foods you eat. But plant-based diets full of leafy greens and legumes can leave you feeling bloated and uncomfortable.

So, we've revised our Enhanced Super Digestive Enzymes and Enhanced Super Digestive Enzymes and Probiotics formulas—now with 10 digestive enzymes to help break down a wider variety of veggies, along with macronutrients like protein, starches and fat.

We've even swapped out amylase in order to not contribute to the quick breakdown of starches into glucose. Both of our Super Digestive Enzyme formulas are gluten-free, non-GMO and vegetarian friendly.





# Heart AND Brain Cells

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with Enhanced
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### 26 BOOST IMMUNE AND DIGESTIVE HEALTH

**Probiotics** with **phages** reduce harmful gut microbes, increasing healthy **digestion** and **immunity**.





#### 38 IMPROVE DIGESTION OF PLANT-BASED FOODS

The trend toward eating **plant-based diets** often requires **special enzymes** to digest **fiber-rich** foods to avoid bloating, gas, and diarrhea.



Oral intake of **collagen peptides** and **hyaluronic acid** reduces eye wrinkle depth up to **20**%.



**Blueberry** polyphenols help reduce **atherosclerosis** via novel mechanisms.



**Lithium** supports **telomere** length, healthy **DNA**, and slower **brain aging**, at ultra-low cost.





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