Impact of Mushrooms on IMMUNE FUNCTION

PLUS: Page 87
Tart Cherry Reduces Inflammation
Enzymatically Active Vitamins

BioActive Complete B-Complex provides enzymatically active forms of meaningful potencies of each B vitamin.

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


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

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

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
AS WE SEE IT: WHY VITAMIN STUDIES CAN SOMETIMES FAIL
Eye-opening reports reveal how deficiencies in magnesium and vitamin K can negate the benefits of vitamin D.

IN THE NEWS
Carotenoids reduce visceral fat; testosterone improves female sexual well-being; microbiome changes associated with Alzheimer’s; shiitake mushroom improves immune function, and more.

REPORTS

ON THE COVER
IMMUNE-BOOSTING PROPERTIES OF MEDICINAL MUSHROOMS
Three types of mushrooms plus beta glucans have been shown to improve immune function.

WHAT HAS SCIENTISTS EXCITED ABOUT NAD+
Nicotinamide riboside increases cellular NAD+ and extends lifespan by 5% in animal studies.

ASHWAGANDHA’S BRAIN BENEFITS
The herb ashwagandha improves brain function and may defend against cognitive decline.

THE VITAMIN D-MAGNESIUM CONNECTION
Magnesium and vitamin D work together to enhance each other’s benefits by improving absorption and activity.

PREVENT SUN DAMAGE FROM THE INSIDE OUT
An oral fern extract with other nutrients decrease UV-radiation-induced DNA mutations by 84%.

DEPARTMENTS

7 AS WE SEE IT:
WHY VITAMIN STUDIES CAN SOMETIMES FAIL
Eye-opening reports reveal how deficiencies in magnesium and vitamin K can negate the benefits of vitamin D.

19 IN THE NEWS
Carotenoids reduce visceral fat; testosterone improves female sexual well-being; microbiome changes associated with Alzheimer’s; shiitake mushroom improves immune function, and more.

79 ASK THE DOCTOR
Dr. Andrew Swick explains the differences among probiotic products and how you can be sure you’re getting the best strain for your specific health situation.

87 WHAT IS TART CHERRY?
The anthocyanins and polyphenols in tart cherries can improve cognition, cardiovascular disease, and the factors underlying gout.
Neuro-Mag® Magnesium L-Threonate was specifically formulated by MIT scientists to be uniquely absorbable by brain and nerve cells.

The numbers of synapses that connect brain cells decline with aging.

Magnesium L-Threonate has been shown to improve synaptic density and other structural components of the brain.*

For full product description and to order Neuro-Mag® Magnesium L-Threonate or Neuro-Mag® Magnesium L-Threonate Powder, call 1-800-544-4440 or visit www.LifeExtension.com.


Magtein® is a registered trademark of Magceutics, Inc. and is distributed exclusively by AIDP, Inc. Magtein® is protected under U.S. patents 8,178,118; 8,142,803; 8,163,301 and other patents pending.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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.

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

Dipnarine Maharaj MD, MB, ChB, FRCP (Glasgow), FRCP (Edinburgh), FRCPath., FACP, is the Medical Director of the 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.
You know zinc is good for you—but are you getting enough?

Zinc promotes healthy immune responses.

Life Extension® provides 50 mg of highly absorbable zinc in each vegetarian capsule.

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

OptiZinc® is a registered trademark of InterHealth Nutrionals, Inc.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Why Vitamin Studies Sometimes Fail

A study published in 2020 evaluated vitamin K and vitamin D status in a large group of people, average age 70.1

Over a 17-year period the researchers found:

• A death rate of 68.2% in the low vitamin K and low vitamin D group.

• Fewer deaths (38.6%) in the normal vitamin D and normal vitamin K group.

This translates into a 60% increased mortality risk in the low vitamin D and low vitamin K group after adjusting for variables such as age and glycemic control.1

This 2020 published report describes mechanisms by which the body needs ample levels of vitamin D and vitamin K to derive their benefits.

What struck me about this study is how it pulls together conflicting findings about the disease-preventing potential of vitamin D.

Studies that fail to show robust benefits might involve population groups that are deficient in other nutrients required for vitamin D to function, such as vitamin K and magnesium.

Most Life Extension® readers supplement with these complementary nutrients, but much of the public remains deficient in magnesium, with less-than-optimal intake of vitamin K.
A meta-analysis of 84 articles published in 2019 reported reductions in all-cause mortality in people with higher blood levels of 25-hydroxyvitamin D.

Another meta-analysis of 21 randomized clinical trials published the same year did not show significant longevity benefits using vitamin D supplements.

In 2007, a randomized placebo-controlled study found a 60% reduced risk for developing any cancer in those supplementing with vitamin D and calcium.

When cancers diagnosed the first year were excluded from this 2007 study, the overall cancer risk was reduced by about 77%.

The 2007 study received widespread media coverage and led more Americans to supplement with vitamin D. Other studies, however, did not find the same cancer rate reductions.

These conflicting data sets about vitamin D caused some doctors to discredit its lifesaving potential. Others said more research is needed before higher-potency vitamin D supplementation is recommended. Much of the public remains confused.

**Putting the Pieces Together**


Calcifications of coronary arteries and valves are common causes of heart disease. Vitamin D upregulates a protein (matrix GLA) that is a powerful inhibitor of vascular calcification.

The upregulated matrix GLA protein then requires vitamin K to activate into calcium-blocking mode.

Deficiency of either vitamin D or vitamin K prevents proper activation of this calcium-blocking protein, which leads to vascular calcification.

The introduction of this editorial described a 2020 published study showing a statistically significant 60% increased mortality risk, after adjustment for age, gender, and glycemic control, in people with low vitamin D+ low vitamin K status.

The authors of this study emphasized the synergistic effects of vitamin D and vitamin K and concluded their paper stating:

“Future studies should investigate whether vitamin D and K supplementation could help improve cardiovascular health and decrease cardiovascular disease risk.”

We at Life Extension® partially concur with this recommendation but opine that greater synergistic benefits might occur if supplemental magnesium is also included.

Vitamin D + Vitamin K

Calcifications of coronary arteries and valves are common causes of heart disease. Vitamin D upregulates a protein (matrix GLA) that is a powerful inhibitor of vascular calcification. The upregulated matrix GLA protein then requires vitamin K to activate into calcium-blocking mode.

Deficiency of either vitamin D or vitamin K prevents proper activation of this calcium-blocking protein, which leads to vascular calcification.

The introduction of this editorial described a 2020 published study showing a statistically significant 60% increased mortality risk, after adjustment for age, gender, and glycemic control, in people with low vitamin D+ low vitamin K status.

The authors of this study emphasized the synergistic effects of vitamin D and vitamin K and concluded their paper stating:

“Future studies should investigate whether vitamin D and K supplementation could help improve cardiovascular health and decrease cardiovascular disease risk.”

We at Life Extension® partially concur with this recommendation but opine that greater synergistic benefits might occur if supplemental magnesium is also included.
Magnesium Activates Vitamin D

Magnesium activates over 300 enzymes in the body, including enzymes needed for vitamin D to become functional.\(^\text{13-15}\)

Optimal benefits of vitamin D might not be achieved without adequate magnesium. That’s because the biological activity of vitamin D is dependent on magnesium!

When you swallow a capsule of vitamin D, it is first converted in the liver into 25-hydroxyvitamin D, and then further transformed in the kidneys into biologically active 1,25-dihydroxyvitamin D.\(^\text{15}\) (See graphic above.)

The transformation into activated vitamin D that occurs in the liver and kidneys is required, whether you obtain your vitamin D from sunlight, food, or supplements.

Both liver and kidney enzymatic conversions of vitamin D are magnesium-dependent. This means that without adequate magnesium, people might not derive optimal benefits of vitamin D because it will not convert into its active form.

The major carrier of vitamin D in blood throughout the body is vitamin D-binding protein. The activity of vitamin D-binding protein is also a magnesium-dependent process.

The graphic above depicts how magnesium is essential for vitamin D to activate and be transported throughout the body.

Researchers continue to explore the degree of magnesium deficiency that has the greatest negative effect on vitamin D activation in the body.\(^\text{16,17}\)

Widespread Magnesium Deficits

It is estimated that the magnesium content in various food and vegetables is 25% to 80% lower compared with the levels before 1950.\(^\text{18}\)

Today’s drinking water contains little or no magnesium. Approximately 64% of men and 67% of women in the U.S. have inadequate dietary intake of magnesium.

Among those above age 71, roughly 81% of men and 82% of women have inadequate dietary intake of magnesium.\(^\text{19,20}\)

Inadequate magnesium levels have been linked with an increased risk for cardiovascular disease, including stroke, coronary heart disease, heart failure, arrhythmia, and death.\(^\text{21,22}\)

Higher blood levels of magnesium are associated with a lower cardiovascular disease risk.\(^\text{22}\)
Are Vitamin D Studies Influenced by Magnesium Intakes?

In the conventional medical setting where vitamin D is used to treat rickets, magnesium supplementation was shown to improve vitamin D status.\(^2^{3-25}\)

In observational studies where vitamin D deficiency was associated with increased cardiovascular mortality risk, consumption of magnesium yielded favorable results.\(^2^{6}\)

The activities of vitamin D–converting enzymes in the liver and kidneys, along with vitamin D–binding proteins in blood rely on magnesium.

According to data from the National Health and Nutrition Examination Survey, higher consumption of magnesium was associated with a reduced risk of vitamin D deficiency or insufficiency.\(^2^{6}\)

Magnesium is an essential cofactor to transform vitamin D into its active form (1,25-dihydroxyvitamin D). Vitamin D in turn can increase intestinal absorption of magnesium.

Clinical Trials Should Include all Three Nutrients

Despite this array of data, clinical trials often test vitamin D by itself.

If miraculous benefits are not found, vitamin D is proclaimed to have failed by the study authors and this is parroted by the media.

I wish there were a way to analyze the studies showing vitamin D’s robust benefits and compare them to those that fail. It could be that the magnesium content of food and water in the area where studies were conducted varied widely.

Dietary intakes of magnesium and vitamin K can be unaccounted confounding factors in studies that test vitamin D alone.
I look forward to studies that combine vitamin D + vitamin K + magnesium to ascertain what degree of overall mortality risk reduction might occur.

These nutrients are inexpensive.

Widespread use might induce meaningful improvements in healthy longevity and lower medical expenditures faced by today’s aging population.

In this month's issue...

Research into the regenerative properties of NAD continues to yield intriguing findings. The article on page 26 describes why increasing numbers of people are using precursors like nicotinamide riboside to boost cellular NAD.

Immune senescence is a widespread cause of chronic inflammation and inability to mount immune responses against pathogens and aberrant cells. Defective immune responses are a common cause of premature illness and mortality, especially in persons over age 65.

The article on page 36 describes a low-cost method of improving immune function.

Summary

The title of this editorial is:

“Why Vitamin Studies Sometimes Fail”

The succinct answer in many cases is the failure to include cofactors like magnesium to enable vitamin D to convert to its active form.

Even more intriguing is 2020 published data showing a 60% increased risk of death in people with low vitamin D and low vitamin K status.

Life Extension® readers should feel vindicated that they long ago began supplementing with vitamin D + magnesium + vitamin K.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club
References


Don’t Weight Around

Maintain Optimal Hormone Levels

7-Keto® is a metabolite of DHEA ideal for weight management.

Maintaining youthful DHEA levels can help support immune function, circulatory health, mood, libido, and more.

DHEA Complete delivers 7-Keto® DHEA (100 mg) and regular DHEA (25 mg), plus extracts from curcumin, green tea, and whole red grapes.

Caution: Consult a physician or licensed qualified health care professional before using this product if you have, or have a family history of breast cancer, prostate cancer, or other hormone-sensitive diseases.

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Fluoride-free Life Extension® Toothpaste contains innovative ingredients that promote healthy teeth and gums.

- **COENZYME Q10** for protection against harmful molecules
- **GREEN TEA** that is rich in protective catechins
- **HYDROGEN PEROXIDE** to thoroughly clean teeth and gums
- **ALOE VERA** to facilitate natural healing
- **XYLITOL** a natural sweetener that won’t decay teeth
- **FOLIC ACID** for healthier and more resilient gums
- **LACTOFERRIN** to support healthy oral hygiene
- **SQUALANE** derived from olives and rich in vitamin E

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
For Heart Health, Strong Bones, and Vital Immune Functions

**Vitamin D3 • 5,000 IU**
Each tiny softgel provides 5,000 IU of vitamin D3 for easy swallowing.

- Item #01713 • 60 softgels
- 1 bottle $7.50
- 4 bottles $6.50 each

**Vitamin D3 • 5,000 IU with Sea-Iodine™**
For those who may be iodine-deficient. Each capsule provides 5,000 IU of vitamin D3 + 1,000 mcg of iodine.

- Item #01758 • 60 capsules
- 1 bottle $10.50
- 4 bottles $9.38 each

**Vitamin D3 • 7,000 IU**
For individuals who need higher levels, including those who weigh over 180 pounds. Each tiny softgel provides 7,000 IU of vitamin D3.

- Item #01718 • 60 softgels
- 1 bottle $10.50
- 4 bottles $9.45 each

**Vitamin D3 • 1,000 IU**
Ideal for smaller individuals who also obtain 2,000-3,000 IU in a multi-formula. Each tiny softgel provides 1,000 IU of vitamin D3.

- Item #01751 • 250 softgels
- 1 bottle $9.38
- 4 bottles $8.44 each

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

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

*If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner.

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.
Only two bioactive coenzyme forms of vitamin B12 can be used directly by the body and brain. The new B12 Elite provides both:

**ADENOSYLCOBALAMIN**
- Active in brain cell mitochondria.
- Preclinical evidence suggests that it may support already healthy levels of dopamine.
- Supports cellular energy production.

**METHYLCOBALAMIN**
- Supports cognition within brain cells.
- Promotes red blood cell production.
- Helps maintain healthy homocysteine levels.

Dissolve in the mouth or chew one vegetarian lozenge daily.

For full product description and to order B12 Elite, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Healthy Bones = Healthy Heart

Three Ways to Get Vitamin K

Super K
Super K is the best-selling vitamin K formula for bone and heart health. It costs only 25 cents a day and provides in one capsule:

- Vitamin K1: 1,500 mcg (converts to K2 in some people)
- Vitamin K2 (MK-4): 1,000 mcg (for bone & vascular health)
- Vitamin K2 (MK-7): 100 mcg (long-acting protection)

Super K Elite
Super K Elite provides 2 additional forms of vitamin K and even higher potencies of K1, MK4, and MK7. Super K Elite costs 60 cents a day and provides in one capsule:

- Vitamin K1: 2,000 mcg (converts to K2 in some people)
- Vitamin K2 (MK-4): 1,500 mcg (for bone & vascular health)
- Vitamin K2 (MK-7): 181 mcg (long-acting protection)

Super K Elite costs 60 cents a day and provides in one capsule:

- Vitamin K2 (MK-9): 43 mcg (added cardiovascular support)
- Vitamin K2 (MK-6): 11 mcg (added cardiovascular support)

Super K Elite
Super K Elite provides 2 additional forms of vitamin K and even higher potencies of K1, MK4, and MK7. Super K Elite costs 60 cents a day and provides in one capsule:

- Vitamin K1: 2,000 mcg (converts to K2 in some people)
- Vitamin K2 (MK-4): 1,500 mcg (for bone & vascular health)
- Vitamin K2 (MK-7): 181 mcg (long-acting protection)

Super K Elite costs 60 cents a day and provides in one capsule:

- Vitamin K2 (MK-9): 43 mcg (added cardiovascular support)
- Vitamin K2 (MK-6): 11 mcg (added cardiovascular support)

Mega Vitamin K2
Japanese physicians use high-dose vitamin K2 for those with challenges in maintaining healthy bone density. Mega Vitamin K2 costs 95 cents a day and provides in one daily capsule:

- Vitamin K2 (MK-4): 45,000 mcg (for bone & vascular health)

Mega Vitamin K2
Mega Vitamin K2 costs 95 cents a day and provides in one daily capsule:

- Vitamin K2 (MK-4): 45,000 mcg (for bone & vascular health)

Super K Item #02334 • 90 softgels
1 bottle $22.50 • 4 bottles $20.25 each

Super K Elite Item #02335 • 30 softgels
1 bottle $18 • 4 bottles $16 each

Mega Vitamin K2 Item #02417 • 30 capsules
1 bottle $28.50 • 4 bottles $26 each

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

CAUTION: If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult with your healthcare provider before taking these products.

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.
2 ways to save

**PREMIER REWARDS**

- **FREE** Unlimited Shipping
- **4%** Back On Purchases
- **☑️ $50 Instant Credit**
  - Use now or save for later.
- **☑️ Worry-Free**
  - No auto-enrollment. Cancel anytime.

**JOIN PREMIER TODAY!**
ONLY $49.95 PER YEAR.

LifeExtension.com/YourPremier

---

**AUTOSHIP & SAVE**

- **Save an average of 16%** on your supplements*
- **FREE Shipping**
  - We ship to any address in the United States (including Alaska and Hawaii) regardless of order size.
- **LOWEST Prices**
  - Always pay the lowest price for your favorite Life Extension® products.
- **NEWEST Formulations**
  - Always receive the latest version of our innovative formulas.

Complimentary program! Cancel any time

LifeExtension.com/AutoShip

---

*Average savings based on the average AutoShip discount across all products. Premier service expires 12 months after date of purchase or renewal and can only be renewed 6 months after premier purchase or renewal. Includes (1) $50 instant credit (not applicable to sale items) for new enrolling subscribers in one 12-month order. Exclusions apply. For retailers or individuals with non-residential addresses, additional shipping and handling apply. International customers pay $99.95 for Premier. During checkout, redeem LE Dollars (one is equal to $1 U.S. Dollar) to purchase products, blood tests, sale items, and shipping fees.
A study reported in *Nutrients* revealed an association between higher levels of carotenoids and a reduction in visceral fat area.*

The investigation included 310 men and 495 women who received an annual health examination as part of the Iwaki Health Promotion Project in Japan. Blood samples were analyzed for the carotenoids alpha carotene, beta carotene, beta cryptoxanthin, lycopene, lutein and zeaxanthin. Diet-history questionnaire responses provided information concerning food intake.

Total carotenoid levels were associated with the intake of leafy green vegetables, carrots and pumpkins, root vegetables and juice. Women’s carotenoid levels were significantly higher than those of men.

Higher total carotenoid levels were associated with decreased visceral fat area and BMI in women, independent of fiber intake. Increased beta carotene, beta cryptoxanthin and lutein levels in women were also associated with a lower visceral fat area.

**Editor’s Note:** “This suggests that consumption of a diet rich in carotenoids (especially lutein and beta-carotene) is associated with lower visceral fat area, which is a good predictor of cardiovascular disease, especially in women,” the authors stated.

Women's Sexual Well-Being Improves with Testosterone Replacement

Women who receive testosterone hormone replacement have improved sexual function and well-being, according to a review and meta-analysis published in *The Lancet Diabetes & Endocrinology.*

Researchers studied 46 reports regarding 36 randomized trials with a total of 8,480 female subjects (the majority of whom were postmenopausal). The trials looked at the effects of testosterone on female sexual function, compared to a placebo, or other hormone replacement.

Compared to the control subjects, women who received testosterone experienced improvements in sexual desire, arousal, responsiveness to stimuli, self-image, orgasm, and pleasure, and felt less concern and distress about sex.

*Editor’s Note:* Women can increase their testosterone levels by using prescription 150 mcg testosterone patches or try 15 mg a day of DHEA that often boosts testosterone levels in women (but not much in men). DHEA is a low-cost supplement whereas testosterone patches are prescription drugs.

Gut Microbiome Connected to Alzheimer's Disease

In an animal study, scientists identified a connection between the composition of the gut microbiome and Alzheimer’s disease, according to an article published in Scientific Reports.*

Researchers compared wild mice with those genetically engineered to carry genes associated with Alzheimer’s. They found a connection between gut composition (based on fecal pellets) and behavioral and cognitive performance in these mice.

They also observed a correlation between changes in the gut microbiome and epigenetic regulation of two genes associated with Alzheimer’s disease (the apolipoprotein E and Tomm40 genes).

This means the composition of the gut microbiome could play a role in turning on genes that contribute to Alzheimer’s disease. Importantly, these changes occurred in the hippocampus, the area of the brain impacted by Alzheimer’s.

These findings are consistent with an observational study of people with Alzheimer’s disease.

Editor’s Note: “The exciting part of this is that you can manipulate the gut microbiome,” said senior author Jacob Raber, MD. “We can use probiotics and see what the effect is.”

Ashwagandha root extract was shown to improve memory and cognitive function in people with mild cognitive impairment, according to a study published in the Journal of Dietary Supplements.*

This double-blind, randomized, placebo-controlled study included 50 adults over age 35 who reported having symptoms of mild cognitive impairment (such as forgetfulness, feeling overwhelmed with decision-making, and drifting thoughts).

The treatment group received **300 mg** of ashwagandha root extract twice daily, and the control group received a placebo.

After eight weeks, the ashwagandha group experienced significantly greater improvements in **general memory** (recall of items such as geometric designs and faces) and **immediate memory** (the ability to recall information over a few seconds, such as a person’s name or a telephone number), compared to the placebo group.

The ashwagandha group also experienced greater improvements in executive function, sustained attention, and information processing speed.

**Editor’s Note:** The researchers concluded, “Ashwagandha may be effective in enhancing both immediate and general memory in people with mild cognitive impairment as well as improving executive function, attention, and information processing speed.”

Eating shiitake mushrooms on a regular basis improves immune function, according to a study published in the *Journal of the American College of Nutrition.*

For the study, 52 healthy adults between 21 and 41 years old were given a four-week supply of either 5 grams or 10 grams of dry shiitake mushrooms.

They cooked the mushrooms at home and consumed a serving every day as instructed.

After four weeks, compared to baseline, researchers observed increases in:

- **Gamma delta T cells**, thought to serve as one of the immune system’s first lines of defense in epithelial and mucosal tissues,
- **NK-T** (natural killer-T) cells, a type of immune cell which promotes the activity that helps defend against infection, and
- **Secretory IgA** (sIgA) production, which protects the nasal mucosa and respiratory tract mucosal surfaces from infection.

*Reductions in* C-reactive protein (CRP) and *increases in* anti-inflammatory cytokines were also seen, suggesting lower inflammation.

The researchers concluded that regular consumption of shiitake mushrooms resulted in improved immunity.

**Editor’s Note:** Shiitake mushrooms could also boost heart health, as they contain beta glucans, a type of fiber that can help lower cholesterol.

Fisetin, a flavonoid found in strawberries and apples, is currently being studied for its effectiveness as a senolytic in humans.\(^1\)

In preclinical studies, fisetin:
- Mimics effects of calorie reduction\(^2\)
- Targets longevity pathways\(^3\)\(^-\)\(^6\)
- Extends lifespan of mice by about 10%\(^7\)
- Removes senescent cells through senolytic action\(^7\)
- Suppresses excess mTOR activation\(^8\)

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

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

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

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

References

Item #02414 • 30 vegetarian capsules

1 bottle $11.25 • 4 bottles $10 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Selenium promotes the body’s production of glutathione, a potent cellular antioxidant. It also encourages healthy cell division, thyroid health, and immune function.

Super Selenium Complex combines three complementary forms of selenium with vitamin E for additional antioxidant protection.

<table>
<thead>
<tr>
<th>Item #01778 • 100 vegetarian capsules</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 bottle $10.50 • 4 bottles $9 each</td>
</tr>
</tbody>
</table>

Each bottle provides a supply that lasts more than three months.

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
What has Scientists Excited About NAD+

BY JEFF SIMMONS
There’s a reason that researchers have zeroed in on NAD\(^+\) as a key factor in a science-based longevity protocol.

Found in every living cell, NAD\(^+\) is essential for life-sustaining functions and cellular integrity.

But here’s the problem—NAD\(^+\) declines with age.\(^1\)-\(^3\)

Fortunately, researchers have identified a form of vitamin B3 called nicotinamide riboside that can effectively increase NAD\(^+\) in the body toward youthful levels.

There is growing evidence from preclinical studies showing that supplementing with nicotinamide riboside can promote longevity.\(^4\)-\(^10\)

One study showed an average 5% increase in the lifespan of old mice—even though supplementation did not begin until the mice were nearing the end of their natural lifespan (24 months).\(^10\)

That would be the equivalent of gaining nearly an additional four years of life based on today’s average human life expectancy of 78.7 years.\(^11\)

More than 50 clinical trials evaluating the impact of nicotinamide riboside on human health and longevity are listed in the U.S. National Library of Medicine.\(^12\)
Boosting NAD⁺ Levels

One of the problems for aging individuals trying to restore NAD⁺ levels is that it is unstable and is not effective when taken orally.

Researchers have discovered a compound called nicotinamide riboside that is a precursor to NAD⁺. This means that taking nicotinamide riboside orally can help jump-start NAD⁺ production. Cells can then use nicotinamide riboside to produce more NAD⁺ on their own, effectively boosting levels even into older age.

In both animal and human studies, nicotinamide riboside quickly boosts cellular NAD⁺ levels and stimulates NAD⁺ metabolism in cells.¹³⁻¹⁵

Anti-Aging Benefits of Raising NAD⁺

A number of studies confirm that replenishing NAD⁺ levels can prevent or even reverse many of the changes associated with aging. It also shields against many of the chronic diseases of age.

Various lab and animal studies show that increasing NAD⁺ levels with nicotinamide riboside:

- Protects against metabolic abnormalities induced by a high-fat diet,¹⁶
- Helps preserve cognition in models of Alzheimer's disease.¹⁷⁻¹⁹
- Reduces fasting and non-fasting blood glucose in a mouse model of type II diabetes, while protecting against diabetic neuropathy and preventing fatty liver disease,¹⁵ and
- Extends lifespan.⁴,⁷,¹⁰

NAD⁺ Boosts Sirtuins

In so many ways, NAD⁺ is essential to the functioning and rejuvenation of the body.

Several important proteins, such as sirtuins, that regulate cellular repair and defenses, require NAD⁺ to function.

Sirtuins are an important target for anti-aging interventions.¹,²,¹⁰⁻²²

Sirtuins are dependent on NAD⁺ to function. NAD⁺ levels markedly decline with age, creating an energy deficit that decreases the body's ability to retain youthful function.²³

Multiple animal studies have demonstrated that increasing sirtuin activity leads to longer life and reduction in age-related loss of function.⁴,⁷,¹⁰

Rejuvenating Stem Cells

As in humans, NAD⁺ levels drop in older mice. This leads to a decline in organ function, including in the ovaries.
One of the most recent studies of nicotinamide riboside evaluated its effect in the ovaries of middle-aged mice.24 These older mice suffer from a loss of ovarian follicles (which contain the egg cells released during ovulation), poor egg quality, infertility, and frequent miscarriages or stillbirths.

A similar decline in human reproductive function occurs with age in women.

But when these older mice were given nicotinamide riboside, the health of the ovaries and reproductive function improved.

Ovarian follicles increased in number, and the mice were able to reproduce more easily and with a higher live birth rate. When scientists examined the ovaries, they saw markers of more youthful biology—healthier cells and improved cellular metabolism.

This improvement in organ function may be largely due to rejuvenation of stem cells.

In adult tissues, stem cells are meant to replace old, dysfunctional, and dying cells with healthy young ones. This maintains the health and youthful function of the tissue. But stem cells themselves age and stop working properly, causing the whole organ to fail.

WHAT YOU NEED TO KNOW

Boost NAD⁺ For Health and Longevity

- Nicotinamide adenine dinucleotide (NAD⁺) is a crucial cofactor for many different enzymes in all cells.
- NAD⁺ is required for the activity of sirtuin proteins, which help regulate metabolism and aging.
- NAD⁺ levels drop significantly with age, contributing to more accelerated aging, loss of function, and risk for chronic disease.
- Nicotinamide riboside, a form of vitamin B3, is a NAD⁺ precursor. Taking it orally has been found to rapidly and safely replenish bodily levels of NAD⁺.
- In many studies, nicotinamide riboside reduces markers of aging in tissues, rejuvenates organ function, revitalizes old stem cells, lowers risk for common chronic diseases, and extends lifespan.
Replenishing NAD⁺ levels with nicotinamide riboside rejuvenated muscle stem cells of aged mice.¹⁰
This study showed that boosting NAD⁺ improved mitochondrial function in muscle stem cells and inhibited stem cell senescence.

The researchers also showed that boosting NAD⁺ decreased senescence of brain and skin stem cells.

Aged stem cells from diverse tissues have been shown to be made more youthful with increased cellular NAD⁺ levels.²⁵,²⁶

In human terms, this is the equivalent of gaining nearly four additional years of life based on today’s average human life expectancy of 78.7 years.¹¹

These studies and others show why scientists and doctors are so excited about raising NAD⁺ levels as one key to anti-aging efforts, and to promoting longevity.

Summary

Studies have consistently shown that increasing NAD⁺ levels improves overall health and extends lifespan in a range of preclinical models.

Longevity is difficult to study in humans because of our long lives. But boosting NAD⁺ has been shown to extend life in several other organisms, including yeast, worms, and mice.⁴,⁷,¹⁰,²⁷

Yeast grown with nicotinamide riboside have an increase in lifespan.⁴ In worms, this NAD⁺ precursor extends life by at least 10%.⁷

In elderly mice the human equivalent of about 70 years of age, nicotinamide riboside extended lifespan by roughly 5% compared to untreated animals.¹⁹

The compound NAD⁺ (nicotinamide adenine dinucleotide) plays a critical role in fighting aging and possibly preventing degenerative disease risk. NAD⁺ is required for cellular enzymes and proteins to work properly. The sirtuin proteins, which are promising targets for life-extending interventions, need NAD⁺ to function.

NAD⁺ levels decline with advancing age.

Nicotinamide riboside, a precursor to NAD⁺, rapidly increases NAD⁺ blood levels.

Boosting NAD⁺ to more youthful levels with nicotinamide riboside has been shown to prolong life and reverse loss of function in animal models.

Life Extension® continues to monitor ongoing trials on the impact that nicotinamide riboside could have on human health and longevity. •
### Nicotinamide Riboside and Resveratrol

**Resveratrol** is a plant compound found in red grapes, red wine, and other darkly colored fruits.

Among its many benefits, it activates **sirtuins**, defender proteins linked to longer, healthier life.\(^2\)\(^3\)\(^0\)

But resveratrol can’t do this if cells are low in **NAD^+**, which is required for sirtuins to work properly. It would be like pressing the accelerator in your car when your gas tank is empty.

The solution is to increase intake of **nicotinamide riboside** to boost NAD^+ levels at the same time as stimulating sirtuin activity with **resveratrol**. This combination can promote optimal sirtuin activity, which can translate to better health and greater longevity.

---

**References**


COMPREHENSIVE Omega-3 SUPPORT

Fish oil is widely used to protect heart health.

Olive oil also has vascular benefits.

Super Omega-3 provides EPA/DHA from ultra-pure fish oil + standardized polyphenols from extra-virgin olive oil.

Sesame lignans stabilize omega-3s to perform better in your body.

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

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

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
With age, our body accumulates *senescent cells* that affect the day-to-day function of the healthy cells around them.

**Senolytics** are compounds that selectively remove senescent cells.

**Senolytic Activator®** contains nutrients designed to target senescent cells for normal elimination.

The new formula contains a patented *fisetin* that is more *bioavailable* than regular fisetin.

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

**COMPREHENSIVE SENOLYTIC SUPPORT**

The new **Senolytic Activator®** formula provides the following nutrients that should be taken **one time each week**:

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

The suggested dose of the new **Senolytic Activator®** is **3 capsules** once a week. Each bottle lasts 3 months and costs very little.
If you experience general fatigue, it may be due to the decline of NAD⁺, an important coenzyme found in every cell.

NAD⁺ facilitates the production of ATP, which your body uses for fuel.

**NAD⁺ Cell Regenerator™** formulas help maintain youthful levels of NAD⁺.

**NAD⁺ Cell Regenerator™ and Resveratrol**
Nicotinamide riboside (300 mg), trans-resveratrol and other cell-energizing nutrients in one capsule.
Item #02348 • 30 veg. caps.

**NAD⁺ Cell Regenerator™**
300 mg of nicotinamide riboside per capsule.
Item #02344 • 30 veg. caps.

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

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

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

By Ronnie Cortez
Mushrooms have been used medicinally around the world for centuries. They contain compounds called beta glucans that are responsible for many of their health benefits, including antiviral and immune-boosting effects.\textsuperscript{1-4}

Studies of mushroom extracts and isolated beta glucans show that these nutrients can help bolster immune defenses against infectious diseases.
What Are Beta glucans?

Beta glucans are a group of polysaccharides naturally occurring in cell walls of seaweed, whole grains, fungi, and mushrooms.

Mushrooms, yeast, and other fungi are particularly rich in beta glucans because their cell walls are made up primarily of these compounds.

Beta glucans can help nourish healthy gut bacteria and augment the action of immune cells throughout the body.5

Mushrooms as Medicine

There are thousands of species of mushrooms, and many have health benefits.

Three have been found to be particularly effective at supporting immune health.

Shiitake

Shiitake mushrooms are a staple of East Asian cuisine and have long been used in traditional Chinese medicine.

In an animal model of severe bacterial lung infection, shiitake mushrooms significantly decreased the number of bacteria in the lungs and improved the animals' condition.6

Other studies have shown antiviral effects against several types of viruses, both by directly inactivating them and by blocking viral replication.7-9

Shiitake mushrooms bolster immune defenses by increasing the number of immune system cells, including T-cells (which fight specific kinds of viruses) and natural killer (NK) cells (which can kill a wide variety of virally infected cells and tumors).10

Shiitake also boosts secretion of antibodies that protect the digestive tract and reduce C-reactive protein, a marker of harmful chronic inflammation.10

Maitake

Maitake mushrooms grow in various parts of the world and are commonly used in cuisine.

In preclinical studies, maitake was shown to activate immune cells such as NK cells and macrophages (which are among the first immune cells to fight an infection).11,12

Extracts of these mushrooms also induce the secretion of interferons, proteins that improve the body's ability to defend against infection.12

Chaga

Chaga mushrooms grow primarily on birch trees in cold climates, including in northern Europe, Asia, and North America. They are powerful immunomodulators.

In a study of mice treated with a drug that inhibits immune system activity, chaga extract returned levels of immune cells almost back to normal.13 It also kept down the levels of tumor necrosis factor, a marker of potentially harmful inflammation.

This mushroom has been shown in various preclinical studies to have antiviral activity against a wide range of viruses. These include various forms of influenza, herpes, hepatitis C, the human immunodeficiency virus (HIV), and others.14-16
Natural Immune Support

Mushrooms contain many different compounds. But when it comes to supporting the immune system, **beta glucans** are considered their single most bioactive component.

These polysaccharide compounds can also be isolated from **yeast**.

They work by binding to receptors on an assortment of cells important for **immunity**. That activates pathways in the cells that boost their function and help them defend against infection and other threats.

Immune responses can be divided into two types: **innate immunity** and **adaptive immunity**.

1. **Innate immunity** is the body’s first line of defense. It is comprised of sentinel cells that detect and attack a wide range of different viruses and pathogens. Cells of innate immunity include macrophages, neutrophils, NK cells, and others.

2. **Adaptive immunity** types are the “big guns” that are brought in later to fight off specific threats—a particular bacteria or virus, for example—once they have been identified. This also helps the body develop **long-term immunity** to a pathogen. The most important of these cell types are **lymphocytes**, including various B-cells and T-cells.

**Beta glucans** have a remarkable ability to activate and stimulate both innate and adaptive immunity.

They can also help block dangerous inflammation. For example, **endotoxin** is a compound produced by disease-causing bacteria. Endotoxin is often used to induce excess, harmful inflammation in experimental animals. Beta glucans **block** this form of inflammation.

A Healthy Gut

A healthy **gut microbiota** (the population of intestinal microorganisms) is also critical to optimal health and fighting **infection**.

In studies, **beta glucans** and **mushrooms** have been shown to encourage the growth of healthy microbiota. That’s because beta glucans serve as **prebiotics**, a source of nutrition for beneficial **bacteria**.

---

**WHAT YOU NEED TO KNOW**

The Magic of Mushrooms

- Various **mushrooms** have long been used for their medicinal properties.
- These medicinal mushrooms, along with baker’s **yeast**, contain compounds called **beta glucans**. These nutrients are responsible for many of the health benefits of mushrooms.
- In studies, mushrooms and beta glucans help strengthen the **immune system** in several different ways, boosting healthy immune responses.
- Along with direct **antiviral** activity, this immune system enhancement helps the body defend against infection and more rapidly eliminate infections that do occur.
- A combination of **beta glucans** from **yeast** along with **shiitake**, **maitake**, and **chaga** mushrooms provides a wide range of compounds to help boost immunity.
These prebiotics stimulate the growth and survival of healthy bacteria while blocking the growth and development of disease-causing bacteria.2

As an added bonus, when beneficial bacteria consume beta glucans, they produce short-chain fatty acids as a byproduct.23,25 These compounds support a healthy gut lining, help regulate appetite and metabolism, reduce harmful inflammation, defend against cancer, and more.26-29

Countering Immune Senescence

As we age, our immune system weakens, a process known as immunosenescence.30 With the deterioration of immune function, the elderly become more susceptible to infectious disease and cancer.

Studies in animal models of aging have shown that intake of beta glucans can help prevent or even reverse these age-related changes.18,31

One study on mice found that by enhancing immune-cell numbers and function, mushroom-derived beta glucans had a rejuvenating effect on immune system responses. They had a similar effect on the gut microbiota, reversing negative age-related changes.31

Fighting Infectious Disease

The effects of mushroom and beta glucans have on the immune system can help prevent and treat infection by a range of pathogens.

In animal models, beta-glucan use dramatically improves survival rates after infection by various bacteria and parasites.32-35

Even in cases of infection that are notoriously difficult to eradicate, beta glucans have shown great promise.

For example, in hepatitis B infection of the liver, the virus can actively suppress the body’s immune response. That leads to chronic infection that can destroy liver function. But in a mouse study, beta-glucans isolated from yeast helped the animals to recruit immune cells to the area and clear the virus.36

Several human trials of beta glucans have been performed as well.37-42 Most used a dose of 250 mg of beta glucans isolated from yeast. Subjects were randomized to receive the beta glucans or a placebo.

A number of benefits were observed, particularly in upper respiratory tract infections such as the common cold and flu.

Subjects receiving the beta glucans had:

- Fewer symptomatic days,
- Less severe infection symptoms,
- Fewer workdays lost to illness,
- Increased numbers of immune cells in the blood,
- Higher levels of interferon secretion, and
- Increased secretion of antibodies in the saliva, an important defense against digestive tract and respiratory tract infections.

One study looked at a non-infectious disorder: ragweed allergy. People suffering from this common allergy were randomized to receive either 250 mg of beta glucans or a placebo for four weeks.43

Those receiving beta glucans had significant reductions in total allergy symptoms and symptom severity. Measures of mood, energy, vigor, sleep, and overall quality of life were all improved as well.
IMMUNE-BOOSTING PROPERTIES OF MEDICINAL MUSHROOMS

Higher Mushroom Consumption is Associated with Lower Cancer Risk

Scientists continue to explore the multiple health benefits of mushrooms.

Researchers at Penn State University performed a systemic review and meta-analysis of observational studies published between 1966 and 2020.* Data from more than 19,500 cancer patients was analyzed specifically for the connection between mushroom consumption and cancer risk. Researchers found that higher mushroom intake was associated with lower risk of cancer.

Further analysis showed that a higher intake of 18 grams per day was associated with a 45% lower risk of total cancer compared to an intake of 0 grams per day.

When site-specific cancer was studied, a significant association was observed with breast cancer and mushroom consumption. Mushrooms, which are low in calories, can be eaten raw as a healthy snack, mixed into a salad, or cooked into different dishes.44

References


This suggests that beta glucans can help improve immune responses not only to infection, but to other forms of inflammation as well.

Summary

Various mushrooms have long been used for their medicinal properties.

Compounds contained in their cell walls, called beta glucans, are most responsible for these benefits.

Medicinal mushrooms and beta glucans can improve immune responses, helping to fight various types of infection and reduce unwanted inflammation.

Beta glucans also help cultivate a healthy gut microbiota while resisting the growth of pathogenic bacteria.

A carefully formulated blend of beta glucans from yeast as well as shiitake, maitake, and chaga mushrooms can help support healthy immune function. ●

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


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

You know you’re still a kid deep down, so why not stay forever young at the cellular level?

**N-ACETYL-L-CYSTEINE**

N-Acetyl-L-Cysteine helps protect your cells from free radical damage so your immune system, respiratory health and liver function will stay youthful.

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

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

Item #01534
600 mg, 60 capsules

1 bottle $10.50
4 bottles $9.25 each

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Humans don’t manufacture vitamin C internally, so it must be obtained through dietary sources or supplements.

Vitamin C is water soluble and needs to be constantly replenished.*

A highly absorbable form of quercetin complements vitamin C’s activity in the body.

Each tablet provides 1,000 mg of vitamin C and 15 mg of Bio-Quercetin Phytosome.

Item #02227 • 250 vegetarian tablets
1 bottle $22.50 • 4 bottles $20 each

Once daily Mushroom Immune provides a blend of:

- Shiitake
- Maitake
- Chaga
- Plus 250 mg of beta glucans

Scientific studies show these four nutrients can:

- Promote innate immune cell function, the body’s first line of defense
- Modulate adaptive immune cells, critical for long-term immune protection
- Exert effects that may reverse many factors of immune senescence
- Encourage a healthy gut microbiota

Wellmune® is a registered trademark of Kerry Group.
ASHWAGANDHA’S Brain Benefits

BY RICK WILSON
Ashwagandha has been used in traditional Indian medicine for thousands of years.¹

Scientists have identified specific effects that ashwagandha has on brain activity.¹⁴

In human studies, ashwagandha intake:⁵,⁶

• Improved cognitive performance in healthy adults.

• Reduced anxiety and stress.

Lab studies show that it may also help protect against structural changes that can lead to Alzheimer's and other forms of dementia.⁷-¹⁰
ASHWAGANDHA'S BRAIN BENEFITS

A Staple of Ancient Medicine

Extracts of ashwagandha's roots and leaves contain a mixture of bioactive compounds, including withaferin A, withanolides, withanosides, and others. These compounds function as antioxidants and anti-inflammatory agents. They also act in other ways to protect the brain from disease.

They cross the blood-brain barrier and enter brain tissue, where they can exert beneficial actions. In healthy adults, ashwagandha taken daily has been shown to improve cognitive performance—with boosts in reaction time, discrimination, vigilance, and other tests of brain function.

Relieving Anxiety and Depression

Nearly 10% of American adults suffer from mood disorders like anxiety, depression, and bipolar disorder in any given year. Stress and anxiety are often treated with drugs that stimulate the receptor for a neurotransmitter called GABA (gamma aminobutyric acid). These drugs have side effects, including fatigue and cognitive impairment.

Ashwagandha stimulates these same GABA receptors, without the side effects. Rather than causing fatigue or cognitive impairment, ashwagandha is known to enhance cognitive performance.

Ashwagandha has long been used to reduce stress and support a healthy mood. A review of human trials found that it improved anxiety symptoms, compared to a placebo.

In animal models of depression, ashwagandha extracts reverse signs of behavioral despair and other abnormalities and improve cognitive function. In two studies in rodents, the magnitude of this impact was comparable to the effects of imipramine and fluoxetine (Prozac®), two drugs used in humans to treat depression and other disorders.

In patients with schizophrenia, who are prone to anxiety and depression, an ashwagandha extract reduced symptoms of both.

Protecting Brain Cells

Ashwagandha may protect against various forms of dementia. In laboratory studies of animal models of Alzheimer's disease, ashwagandha displays various mechanisms known to reduce its progression.

One of the primary features of Alzheimer's is the accumulation of an abnormal protein called beta-amyloid. This buildup inflicts toxic effects on brain cells and incites aggressive chronic inflammation, which leads to further deterioration of brain function.

Preclinical studies have shown that ashwagandha:

- Reduces the formation of amyloid in the brain and brain cells;
- Prevents the accumulation and aggregation of amyloid;
- Reduces the toxic impact of existing amyloid, protecting brain cells from injury and inflammation, and;
- Aids in removing existing amyloid deposits, reversing Alzheimer's disease pathology.

Animal models of Alzheimer's also show a drop in two key proteins associated with brain maintenance and repair: brain-derived neurotrophic factor (BDNF) and glial fibrillary acidic protein (GFAP). Ashwagandha helps maintain higher levels of both these protective proteins.

Boosting Acetylcholine

One effect of memory loss caused by Alzheimer's disease is a loss of acetylcholine function. Acetylcholine is a neurotransmitter used for cell-to-cell communication in the brain. It is vital to normal cognitive function.
Some medications used to treat Alzheimer’s inhibit the enzyme that breaks down acetylcholine, boosting its levels. Ashwagandha also blocks this enzyme, increasing acetylcholine levels.8-10 Together, these actions suggest that ashwagandha could help fight some of the primary damage that is among the causes of Alzheimer’s disease, while also supporting healthy brain function.

Ashwagandha has also shown promise in preclinical studies of other neurodegenerative diseases, including Parkinson’s disease, amyotrophic lateral sclerosis (ALS), and Huntington’s disease.1,2,28,29

Defense Against Neurotoxins

Ashwagandha has been found, in preclinical models, to shield against a range of neurotoxins, including lead, aluminum chloride, streptozotocin, scopolamine, kainic acid, and bisphenol A (BPA, a common additive in plastics).1,30,31

WHAT YOU NEED TO KNOW

Brain Benefits of Ashwagandha

- **Ashwagandha** is a plant native to India and surrounding parts of Asia. It has been used in traditional Indian medicine for millennia to promote overall health.

- Modern science has found that ashwagandha promotes healthy functioning of the **brain**.

- Extracts of ashwagandha may protect the brain from damage caused by a wide range of **toxins**, injuries, and **stroke**.

- Oral intake improves **cognitive performance** in healthy adults and in those with signs of cognitive decline.

- Ashwagandha reduces stress and anxiety, and relieves symptoms of depression.

- Research shows that ashwagandha may help protect against forms of dementia, including **Alzheimer’s disease**.
One example is **glutamate**. Glutamate is an amino acid that acts as a neurotransmitter in the brain. Normal levels of glutamate are vital to brain communication. But very high levels of glutamate can cause **excitotoxicity**—overstimulation of brain cells that can cause them to go haywire, and even die. Some brain injuries, such as **traumatic head injuries** and **stroke**, cause a huge release of glutamate that results in further cell death. 

**Glutamate excitotoxicity** has been found to be a component of the pathology seen in neurodegenerative disorders, such as Alzheimer’s disease, Parkinson’s disease, ALS, and multiple sclerosis. 

**Ashwagandha** defends the brain against this damage. In lab studies, pretreatment with ashwagandha extracts **before** exposure to high levels of glutamate markedly **inhibit cell death** and other changes associated with excitotoxicity. 

**Helping Stroke Victims**

The most common forms of **stroke** result from a lack of oxygen and blood to the brain, leading to cell dysfunction and death.

In several animal studies of experimental stroke, **ashwagandha** intake prevented much of this brain damage. It reduced the size of the brain injury and the biochemical changes that typically accompany stroke.

This helped prevent the behavioral, motor, and cognitive dysfunction that would otherwise have occurred.

These actions, along with its other benefits, make **ashwagandha** a powerful neuroprotective nutrient.

**Summary**

The herb **ashwagandha** has been used for its diverse health benefits for thousands of years. Ashwagandha extract appears to be beneficial to the **brain**.

It may shield the brain from damage resulting from exposure to **toxins**, physical injury, and **stroke**.

It helps relieve stress and improves symptoms of **anxiety** and **depression**.

Ashwagandha also improves **cognitive performance** and may defend against cognitive decline and dementia.

**References**

Researchers have identified a unique form of sage that improves cognitive function. Clinical evidence demonstrated that this proprietary extract increased memory performance in older adults by nearly 60% and improved attention by 250%—within hours of ingestion. In addition to enhancing cognitive function in humans, this unique sage extract has been shown to increase lifespan by 12% in a C. elegans model of aging.

Phosphatidylserine is a phospholipid, one of the structural components of the membranes that surround all cells in the body. This is especially critical for nerve cells in the brain, because it is their cell membranes that carry nerve impulses throughout the nervous system. The myelin that surrounds nerve fibers and aids signal conduction also relies on phosphatidylserine for normal structure and function. Aging is associated with structural deterioration in the nervous system, which may be reduced by phosphatidylserine’s ability to preserve cognitive function.

Blueberries are packed full of anthocyanins, powerful compounds that help protect the plant from oxidative stress. These compounds have been explored in the medical literature for years for their potential health benefits to humans. Several recent trials in humans have demonstrated that blueberries enhance cognitive function. Not only has blueberry been found to enhance memory and other cognitive performance in older subjects, it improves mood and cognition in children and young adults as well.

Pregnenolone, a hormone and hormone-precursor, as well as the derivatives it forms in the brain, have modulatory effects on nervous system function. Several studies in animals and humans have reported beneficial effects for the brain. Pregnenolone appears to be a neuroprotectant, defending the brain from various forms of injury. It has also been found to have positive effects on mood, memory, and other aspects of cognition.
ASHWAGANDHA’S BRAIN BENEFITS


23. Jayaprakasam B, Padmanabhan K, Nair MG. Withanamides in Withania somnifera fruit protect PC-12 cells from beta-amyloid responsi


36. Mukherjee S, Kumar G, Patnaik R. Withanolide A: A penetrates brain via intra-nasal administration and exerts neuroprotection in cerebral isch


46. McNamara RK, Kalt W, Shidler MD, et al. Cognitive response to fish oil, blueberry, and combined supplementation in older adults with subject


50. Vallee M. Neurosteroids and potential therapeutics: Focus on pregneno
The health benefits of Curcumin Elite™ Turmeric Extract and Pro-Resolving Mediators stand on their own. Taken together? You have an elegant pairing for whole-body health on your hands!

First, curcumin helps promote a healthy inflammatory response. Next, Pro-Resolving Mediators promotes a healthy post-inflammatory response by helping your body remove cellular debris for healthy tissue to flourish.

It’s the perfect complementary combo!

For full product description and to order Curcumin Elite™ Turmeric Extract and Pro-Resolving Mediators, call 1-800-544-4440 or visit www.LifeExtension.com

Is Your Body in Sync?

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.
Broccoli

THE TREE OF LIFE

Just one daily Optimized Broccoli and Cruciferous Blend tablet provides you with the same potent cell-protective and hormone health-promoting benefits as fresh vegetables.

For maximum benefits and absorption this enteric-coated tablet contains two layers:

- **Vegetable extracts** from broccoli, watercress, cabbage, and rosemary, and
- **Myrosinase** to release **sulforaphane** in the small intestine.

Item #02368 • 30 enteric coated vegetarian tablets
1 bottle $28.50 • 4 bottles $26.50 each

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

TrueBroc® Produced under US patents 5,725,895; 5,968,505; 5,968,567; 6,177,122; and 6,242,018 licensed from Brassica Protection Products LLC; TrueBroc® is a trademark of Brassica Protection Products LLC; BroccoVital® Myrosinase is a registered trademark of Berg Imports, LLC.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Ashwagandha has been shown to improve cognitive function, reduce stress, and help maintain more youthful brain cell structure.

Optimized Ashwagandha provides standardized leaf and root extracts at a low consumer cost.

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
The **VITAMIN D-MAGNESIUM** Connection

BY MARSHA MCCULLOCH, RD
The use of vitamin D has grown substantially over the past decade.\(^1\)

That’s for good reason. Vitamin D is essential for immune function, heart health, and cognitive performance.\(^2,3\)

Unfortunately, many people aren’t getting the full benefits of vitamin D because they have a low level of magnesium.\(^4\)

Researchers have documented the essential relationship between magnesium and vitamin D.\(^4\)

It’s estimated that 45% of Americans are magnesium deficient.\(^5\)

Magnesium is essential for converting vitamin D into its active form in the body.\(^6,7\) Magnesium also aids vitamin D transport in the blood.\(^8,9\)

At the same time, maintaining sufficient levels of vitamin D helps magnesium achieve its many benefits.\(^10-12\)

A growing number of human studies focusing on the use of both vitamin D and magnesium are confirming their combined benefits for immunity, muscle strength, heart health, and more.\(^13-15\)
The Importance of Vitamin D and Magnesium

Vitamin D and the mineral magnesium each have well-known health benefits. Low levels of vitamin D can lead to weak bones, along with increased risk for cardiovascular disease, metabolic disorders, and cognitive decline.\(^{16-18}\)

Magnesium deficiency can result in muscle spasms and cramps.\(^{19}\) Low magnesium can also contribute to osteoporosis, irregular heart rhythms, and migraines.\(^{20}\)

Oral intake of vitamin D and magnesium, individually, can help treat or lower risk for many of the same health concerns. These include:\(^{2,8,9,20,21}\)

- Musculoskeletal disorders,
- Type II diabetes,
- Cardiovascular disease,
- Some cancers,
- Immune system problems, and
- Neurological conditions, such as depression and dementia.

But for vitamin D and magnesium to work optimally, they need each other.

Magnesium Activates Vitamin D

Vitamin D consumed orally or made in the skin from sun exposure is inactive.\(^{10}\)

This is also true of both vitamin D2, which is obtained from plant sources, and vitamin D3, which is made in the skin or found in oily fish and eggs.\(^{22}\)

Before vitamin D can perform its vital functions, it must be activated by a two-step process:\(^{10,23-25}\)

In the liver, an enzyme called 25-hydroxylase converts vitamin D2 and D3 to 25-hydroxyvitamin D. This is the major circulating form of vitamin D measured in blood tests to assess vitamin D levels.

In the kidneys (and other tissues) another enzyme, 1-alpha-hydroxylase, converts 25-hydroxyvitamin D into active vitamin D.

Both of these enzymes need magnesium to function properly.\(^{6,7}\) Otherwise, vitamin D will remain in its inactive form, making it all but useless.

Magnesium also regulates 24-hydroxylase, an enzyme that helps inactivate vitamin D when there’s an excess supply.\(^{4,6}\)

Transport and Regulation of Vitamin D

Magnesium enables vitamin D to bind to a carrier protein that transports it through the blood.\(^{6,8}\)

Then, when active vitamin D arrives where it is needed, magnesium helps activate the receptors needed for cells to use vitamin D.\(^{20}\)

Magnesium deficiency decreases the number of vitamin D receptors in cells, limiting the vitamin’s effects.\(^{20}\) Aging leads to a decrease in vitamin D receptors.\(^{26}\)

Magnesium also boosts vitamin D activity by supporting synthesis and secretion of parathyroid hormone.\(^{5,8,10,11}\) This hormone stimulates the kidneys to convert vitamin D to its active form.\(^{22}\)

Vitamin D’s Impact on Magnesium

The magnesium-vitamin D partnership isn’t a one-way street.

Vitamin D can enhance intestinal absorption of magnesium, particularly in people with low magnesium levels.\(^{10-12}\) This allows the mineral to be more efficiently used by the body.

In one human study, obese women given a vitamin D injection had a significant increase in their blood levels of magnesium.\(^{12}\)
A Life-Saving Partnership

The link between vitamin D and magnesium can be seen in studies of longevity.

Vitamin D deficiency is known to be associated with a higher risk of death. In a large observational study, low magnesium levels made that risk even greater.27

In this study, 1,892 men (ages 42-60 years) were followed for an average of 22 years.

In men with low vitamin D levels, a lower magnesium intake (less than 414 mg per day) was associated with a 60% greater risk of death than for those with a higher magnesium intake.27

Further evidence of the link between the two nutrients comes from studies of rickets, a softening or weakening of bones caused by severe and prolonged vitamin D deficiency.

In these studies, vitamin D intake alone failed to treat rickets. But adding magnesium to the regimen supported vitamin D activation and helped resolve the condition.4

In another recent study, 27 healthy, postmenopausal women were given 500 mg of magnesium daily for two months, while 25 matched women received placebo. Most of the women were vitamin D deficient, and many were low in some measures of magnesium.

This study showed that in response to magnesium supplementation (with no vitamin D), the number of women deficient in vitamin D decreased by about 20%.28

Bone and Teeth Health

Both vitamin D and magnesium are important for healthy bone mass and strength.19,29

Together, they are even more beneficial. Vitamin D promotes intestinal absorption of calcium and magnesium, which are vital components of bone that help prevent osteoporosis. Insufficient magnesium can impair bone health by causing a reduction in parathyroid hormone levels and a decrease in active vitamin D levels.11

Vitamin D and magnesium also play key roles in replenishing the minerals in teeth. This may help prevent tooth loss.29,30

Optimizing vitamin D intake also promotes the success of dental implant surgery, an increasingly popular option for replacing missing teeth.31

Oral health has a wide impact on whole-body health due to the association between periodontal disease (gum inflammation) and systemic disease, including type II diabetes and cardiovascular disease.30

Vitamin D and magnesium help combat oral inflammation to prevent periodontal disease.29,32

WHAT YOU NEED TO KNOW

Vitamin D and Magnesium: Partners in Health

- The vitamin D produced from sun exposure and consumed in food or through direct oral intake is inactive.
- Enzymes that activate vitamin D require the mineral magnesium to work properly. Magnesium also supports the transport of vitamin D throughout the body.
- Vitamin D can enhance magnesium absorption in the intestines.
- By working in partnership, magnesium and vitamin D support musculoskeletal and heart health and promote proper metabolic function.
Muscle Strength and Function

One of the most significant challenges in aging is sarcopenia, the loss of muscle mass, strength, and function. It frequently leads to falls and fractures in older adults.33

Chronic inflammation is one contributor to sarcopenia. Vitamin D and magnesium can help reduce inflammation and may prevent sarcopenia.14

Scientists have discovered that muscles have receptors for vitamin D. As people age, these tend to decline in number. Taking oral vitamin D increases the number of receptors in muscle tissue.34

In a study of 83 healthy, middle-aged women deficient in vitamin D, half the group received 50,000 IU of vitamin D weekly and 250 mg of magnesium daily for eight weeks. The rest of the group received placebos.

Women who received the vitamin D and magnesium had a significant increase in handgrip strength and overall mobility, compared to the placebo group. The treatment group also had a decrease in an important inflammatory marker, compared to the beginning of the study.14

Cardiometabolic Health

In observational studies, higher intake and blood levels of both vitamin D and magnesium have been linked with a lower risk of insulin resistance and type II diabetes.35,36

Vitamin D appears to improve insulin secretion from the pancreas, which has specific receptors for interacting with the vitamin.35 Magnesium also supports insulin secretion.37

Magnesium plays an important role in protecting cells from oxidative stress as well. Magnesium deficiency results in decreased production of glutathione, one of the body’s most potent antioxidants.37

Multiple studies conducted across several decades show that magnesium and vitamin D intake interacted in affecting vitamin D status.4,38,39

The vitamin and mineral intake also interacted with circulating vitamin D levels in the risk of cardiovascular mortality.4,6

Without enough magnesium and vitamin D, calcium isn’t properly routed to the bones. Instead, calcium is more likely to deposit in arteries, increasing risk of cardiovascular disease.11,40
Summary

The health benefits of vitamin D are well-established. But the effectiveness of vitamin D intake depends on getting enough magnesium, a nutrient on which nearly half of all Americans fall short.

The body needs magnesium to activate and transport vitamin D. In return, vitamin D can enhance magnesium absorption and retention.

Working together, magnesium and vitamin D can benefit musculoskeletal, metabolic, and heart health.

Vitamin D and magnesium are clearly both vital for overall health. Taking one without the other fails to take advantage of their full benefits.

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

References

FEED YOUR BRAIN

FOR OPTIMAL BRAIN HEALTH

**Cognitex® Elite** contains clinically studied brain-boosting nutrients.

A patented **Sage Extract** by itself demonstrated improvement in attention and memory performance in healthy, older volunteers.

**Cognitex® Elite** provides all of these ingredients:

- SIBELIUS™: Sage extract (leaf) 333 mg
- AuroraBlue® Wildcrafted 200 mg
- Blueberry Complex
- Sensoril® Ashwagandha extract 125 mg
- Phosphatidylserine 100 mg
- Uridine-5'-monophosphate 50 mg
- Vinpocetine 20 mg

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

---

For full product description and to order **Cognitex® Elite** or **Cognitex® Elite Pregnenolone**, call 1-800-544-4440 or visit www.LifeExtension.com

Do not use if you are of childbearing age, pregnant or planning to become pregnant.

SIBELIUS™ is a trademark of Sibelius Limited. CHRONOSCREEN™ is a trademark of Chronos Therapeutics Limited. AuroraBlue® is a registered trademark of Denali BioTechnologies, Inc. Sensoril® is protected under US Patent Nos. 6,153,198 and 6,173,092 and is a registered trademark of Natreon, Inc.

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.
More Nutrients
Higher Potencies

LIFE EXTENSION®
TWO-PER-DAY

Compared to Centrum®, Two-Per-Day Provides:

- 50 times the VITAMIN B1
- 25 times the VITAMIN B6
- 12 times the VITAMIN B12
- 10 times the BIOTIN
- 10 times the SELENIUM
- 8 times the VITAMIN C
- 2.5 times the VITAMIN B3
- 2 times the VITAMIN D
- 3 times the VITAMIN E
- 2 times the ZINC

Two-Per-Day Multivitamin Capsules
Item #02314 • 120 capsules (two-month supply)
1 bottle $18 • 4 bottles $16 each

Two-Per-Day Multivitamin Tablets
Item #02315 • 120 tablets (two-month supply)
1 bottle $17.25 • 4 bottles $15.50 each

Each bottle provides a two-month supply.

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

Lycored LycoBeads® is a registered trademark of Lycored; Orange, New Jersey. SelenoExcell® is a registered trademark of Cypress Systems Inc. L-OptiZinc® and logo are trademarks of Lonza or its affiliates. Crominex® 3+, Capros® and PrimaVie® are registered trademarks of Natreon, Inc.

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.
EXTEND-RELEASE MAGNESIUM
When You Need It

Unique delivery system provides immediate and extended-release magnesium for full-body coverage of this essential mineral.

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

ZümXR® is a registered trademark and protected by patents. See www.ZümXR.com

Item #02107 • 60 vegetarian capsules
1 bottle $9.75 • 4 bottles $8.75 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
DEFEND YOUR HEALTH

VITAMIN D3

Systemic support for immune function, bone health, and normal blood-sugar levels.

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

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

Item #01713 • 5,000 IU • 60 softgels
1 bottle $7.50 • 4 bottles $6.50 each

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Dopamine, the “feel good” neurotransmitter, regulates motivation, mood, movement, and cognitive function.

With age, dopamine levels decline due to the increase of the MAO-B enzyme.

Amur Cork Tree (Phellodendron bark) can help preserve dopamine by inhibiting MAO-B activity.

Dopamine Advantage provides 500 mg of Amur Cork Tree in each capsule.

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

Note: Those who take MAO-B-inhibiting drugs like deprenyl do not need to take phellodendron.
Prevent Sun Damage from the Inside Out

BY MICHAEL DOWNEY
We all know the one surefire way to help protect against ultraviolet radiation that causes skin cancer: use sunscreen.

But a recent study by the U.S. Food and Drug Administration (FDA) reported alarming findings. At least six of the most common chemicals used in most commercial sunscreens—the very chemicals that provide the UV protection—were absorbed into the bloodstream after just one application!

Not only that, but they were found in the bloodstream at levels that ranged from over six times to over 500 times greater than the FDA’s recommended safety threshold.

Every single sunscreen chemical tested, in every form of application (lotion and three different types of spray), ended up in the bloodstream in amounts considerably greater than what the FDA considers low risk.

No one should stop using sunscreen. But there are safer ways to protect yourself against the damage UV light can cause.

One option is to use sunblock containing titanium dioxide or zinc oxide, mineral compounds that reflect UV rays. This is different from the sunscreen chemicals mentioned above that absorb UV rays.

Another option can be used along with sunblock: an oral extract of the fern Polypodium leucotomos. Rather than blocking the sun’s rays, it blocks the damage they can do.

A randomized controlled clinical trial showed that taking Polypodium extract before UV exposure led to a striking 84% decrease in a UV-induced DNA mutation.

For added sun protection, nicotinamide enhances DNA repair and reduces UV-induced immune suppression. An orange extract from select Sicilian red oranges boosts protection further, reducing sunburn intensity by about 35%.

These nutrients work from the inside out to help protect against sun damage.
Sunscreen Chemicals in the Blood

Skin cancer affects over three million Americans each year.¹⁰⁻¹³

Using sunscreen is important. But most topical sunscreens block only a portion of harmful ultraviolet radiation from reaching the skin. They also break down over time, reducing their effectiveness.¹⁴

A new study by the U.S. Food and Drug Administration (FDA) raises another concern. After applying sunscreen to study subjects, and then testing their blood for six chemicals used in the sunscreens, scientists found blood levels of those chemicals ranging from over six to over 500 times greater than the agency’s recommended safety threshold.¹

Both the FDA and the American Academy of Dermatology stress that these chemicals have not been proven to be unsafe. However, they have been associated with possible hormone disruption and liver and kidney issues.¹⁵

Until the health effects of these ingredients are more fully understood, the FDA advises that people continue to use sunscreens.¹,¹⁵

Mineral-Based Sunblock: A Safer Option

Sunscreens come in two types. One contains chemicals and combinations of chemicals that absorb ultraviolet radiation. The other contains minerals, such as zinc oxide and titanium dioxide, that block UV rays.²,⁴

Both the FDA and the Environmental Working Group have determined that sunblocks relying on a mineral ingredient like titanium dioxide are safe and effective.²,⁴ They sit on the skin’s surface and act as a shield.

No matter what sunscreen you use, though, it can’t provide total protection. Among the reasons:¹⁶

- Sunscreens don’t protect the scalp or eyelids,
- Sunscreens may be rubbed off or washed off by perspiration or swimming,
- Most people don’t apply nearly enough to block the sun’s rays, and
- UV rays penetrate some fabrics in clothes, reaching areas where people have not applied sunscreen.

Scientists have discovered that an extract of a tropical fern called Polypodium leucotomos offers an ideal addition to topical sunscreens.

It protects the skin against ultraviolet damage caused by the sun. And because it is taken orally, it works on all skin areas evenly, and it won’t wash or rub off.
How Polypodium Works

The sun’s ultraviolet radiation causes premature skin aging and skin cancer by:17-19

- Inducing DNA damage,
- Generating inflammation, and
- Increasing oxidative stress.

Research shows that the polyphenols in Polypodium leucotomos protect DNA and inhibit oxidative stress as well as inflammation.6

Clinically Validated in Humans

Scientists recruited healthy volunteers between ages 29 and 54 and divided them into control and treatment groups.

The treatment group took 240 mg of Polypodium leucotomos extract orally, two times, eight and two hours before being exposed to UV rays.6

Subsequent skin biopsies showed significant decreases in DNA damage in the treated subjects.5 When subjected to a low dose of UV light,6

- Placebo participants had a 217% increase in a damaging DNA mutation, while
- Polypodium-taking participants had a striking 84% decrease in that DNA mutation.

WHAT YOU NEED TO KNOW

The Ultimate in Sun Protection

- Ultraviolet radiation is a major cause of skin cancer and premature skin aging.
- Sunscreens are the first line of defense against UV rays. But a new FDA study found that the chemicals used in most sunscreens are absorbed into the blood at alarmingly high levels after just one application.
- A sunblock that contains a mineral compound such as zinc oxide or titanium dioxide is considered safer, but still does not provide complete protection.
- Scientists have shown that a tropical fern extract called Polypodium leucotomos prevents the UV-induced DNA damage that leads to skin aging and skin cancer.
- Two other nutrients, nicotinamide (a form of vitamin B3) and red orange extract, further boost sun protection.
- These three ingredients reduce DNA mutations, support the repair of already damaged DNA, lower sunburn intensity and inflammation, and provide powerful protection against skin cancer and skin aging.
When subjected to a higher dose of UV light, The DNA mutation in the placebo group increased by a shocking 760%, while The DNA mutation in the Polypodium group increased by only 61%.

Since DNA mutations are a main cause of prematurely aged skin and skin cancer, Polypodium leucotomos has an enormous potential protective benefit.

### Further Sun Defense with Nicotinamide

Two ingredients, nicotinamide and red orange extract, offer additional protection against sun damage. Nicotinamide is a form of vitamin B3. Scientists recently completed a review study of its effects, and found that nicotinamide safely:

- Enhances DNA repair,
- Reduces UV-induced suppression of immunity, and
- Acts as an anti-inflammatory.

Ultraviolet radiation normally causes the loss of ATP (adenosine triphosphate), the energy-carrying molecule that plays a role in DNA repair. Nicotinamide prevents this loss, allowing DNA to be continuously repaired.

In a study that demonstrated this activity, scientists pretreated skin cells with nicotinamide and exposed them to UV radiation. The nicotinamide treatment increased the removal and replacement of damaged DNA and significantly increased the number of cells undergoing DNA repair.

A clinical trial further validated that nicotinamide protects against UV-induced immune suppression. These two actions alone—repairing DNA and protecting against immune suppression—powerfully reduce the risk of skin cancer. But nicotinamide goes even further. It also:

- Inhibits production of inflammatory proteins (cytokines), reducing inflammation,
- Regulates skin barrier function, which helps keep moisture in and harmful elements out, and
- Restores cellular energy levels after UV exposure.
Together, these actions can lead to a significant reduction in skin cancers.

In fact, in the randomized, controlled, clinical trials analyzed for the review study, nicotinamide was shown to reduce development of new, non-melanoma skin cancers in high-risk people.\(^7\)

In one trial, scientists enlisted 386 healthy participants, all of whom had been diagnosed with at least two non-melanoma skin cancers in the previous five years.

This put them into the “high-risk” category for future skin cancers.

Twice a day, volunteers received either 500 mg of nicotinamide or a placebo. After 12 months, the rate of new, non-melanoma skin cancers in the nicotinamide group was reduced by 23% compared to placebo.\(^31\)

### Added Protection from Red Orange Extract

An extract of Sicilian red oranges provides an extra layer of protection against UV-induced inflammation and oxidative stress.\(^\)

This extract is obtained from pigmented varieties of sweet oranges. Its benefits are due to its abundant flavonoids (health-promoting plant pigments) and hydroxycinnamic acid, another compound with antioxidant effects.\(^32-35\)

Researchers applied this sweet red orange extract to human keratinocytes, the most common type of cell in the epidermis (the outermost layer of the skin). When they exposed these cells to UV radiation, the extract significantly reduced inflammation, cell damage, and cell death.\(^33\)

In a human clinical study, oral use of red orange extract reduced sunburn intensity by about 35%.\(^9\)

This is extremely significant, because the number of lifetime severe sunburns closely correlates with the development of skin cancers.\(^36-38\)

In another clinical study, volunteers took red orange extract and were exposed regularly to a solar lamp.\(^8\)

After 15 days, the extract had reduced age-spot pigmentation and decreased melanin content from 27% to 7%. It also decreased UV-induced sunburn.

The study concluded that red orange extract can improve skin appearance and protect the skin against sun damage and photoaging, aging of the skin caused by ultraviolet radiation.\(^8\)
References

> Lutein, trans-zeaxanthin, and meso-zeaxanthin helps maintain structural integrity of the macula and retina.¹⁻⁵
> Cyanidin-3-glucoside assists with night vision.⁶⁻⁸
> Saffron has been shown to help support vision. Study subjects were able to read an average of two additional lines on a vision chart used by doctors in eye exams.¹
> Alpha-carotene further helps support macular density.¹

For full product description and to order either of these MacuGuard® formulas, call 1-800-544-4440 or visit www.LifeExtension.com

References
Topically applied glutathione and niacinamide inhibit melanin synthesis for a more profound skin-brightening effect.

Three additional compounds (palmitoyl tripeptide-5 + acetyl hexapeptide-51 amide + Aspalathus linearis leaf extract) improve skin appearance by boosting collagen synthesis and enhancing DNA function.

Brightening Peptide Serum combines these ingredients to help diminish the appearance of age spots, equalize skin tone, and moisturize.

Item #80179
Net Wt. One Fl. Oz. (30 ml)
1 bottle $34.50 • 4 bottles $29.25 each

For full product description and to order Brightening Peptide Serum, call 1-800-544-4440 or visit www.LifeExtension.com
SAFE-GUARD
Your Skin from Within

Unique ORAL formula provides *Polypodium leucotomos* fern extract along with nicotinamide and red orange extract.

Item #01938 • 120 vegetarian capsules

1 bottle $33

2 bottles $30 each

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

Red Orange Complex® is a registered trademark of Bionap S.r.l.
This product is not a substitute for topical sunscreens.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Consumers often spend hundreds of dollars on just one pair of so-called “designer” sunglasses. Life Extension® supporters can obtain superior protection against damaging solar radiation at a fraction of the price.

**SolarShield® sunglasses** are recognized as the number-one doctor-recommended sunglasses in the world, with more than 50 million pairs sold to date.

Patented **SolarShield®** sunglasses with **durable polycarbonate lenses** and **100% UV protection** fit comfortably over prescription eyewear.

**At fantastically discounted prices!**

<table>
<thead>
<tr>
<th>SolarShield® sunglasses</th>
<th>Item #00657</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 pair</td>
<td>$9.74</td>
</tr>
<tr>
<td>4 pairs</td>
<td>$8.63 each</td>
</tr>
</tbody>
</table>

**Compare the low price** to sunglasses sold in stores and see savings exceeding 90%!

SolarShield® is a registered trademark of Dioptics, Inc.

For full product description and to order **SolarShield® sunglasses**, call 1-800-544-4440 or visit www.LifeExtension.com
Scientific research has shown a wide range of benefits for probiotics in recent years.

As a result, there’s now a glut of products on the market with probiotics added to them, from dietary supplements to breakfast cereals.

But probiotics aren’t all the same, and it’s important to take ones that have been tested and verified as effective in scientific studies.

In this interview with Life Extension®, Dr. Andrew Swick talks about the benefits of different probiotic strains, how you can ensure you’re getting the right kinds, and more.

**LE:** Probiotics are very popular now. What exactly are they?

**Dr. Swick:** Probiotics are live microorganisms that provide health benefits when consumed in appropriate amounts. The majority of probiotics are healthy bacteria. These “good” bacteria are beneficial in many ways, including some that help fight off “bad” bacteria. Probiotics take part in the larger community of microorganisms that live in many areas of your body, including your gut, skin, and mouth. This larger community is most commonly referred to as your “microbiome.”
**LE:** People often hear that fermented foods like yogurt contain probiotics. Is that correct?

**Dr. Swick:** Yogurt and other fermented foods, including kefir, kimchi, kombucha, sauerkraut, and pickles, do contain live microbes. These active cultures are popularly referred to as probiotics. But while these foods may provide some health benefits, they don’t always meet the strict **scientific definition** of probiotics. The International Scientific Association for Probiotics and Prebiotics (ISAPP) only designates **strains** that have been **characterized** (properly identified and named), scientifically studied, and demonstrated to provide health benefits, as **probiotics**. Fermented foods contain mixtures of microbes that are for the most part **uncharacterized**, and may not meet the level of scientific evidence required by the ISAPP to be considered probiotics.

**LE:** You mentioned strains. What are those and how do consumers know if they are getting the correct strain?

**Dr. Swick:** Consumers should look at the **full** name of each probiotic listed on a product label. Each probiotic has three names in the following order: **genus**, **species**, and **strain**. For example: In **Lactobacillus rhamnosus** CRL1505, **Lactobacillus** is the genus, **rhamnosus** is the species, and CRL 1505 is the strain.

Consumers sometimes overlook the **strain**, but it's very important. The specific strain is what was studied to determine the health benefits associated with the probiotic. Strains are not interchangeable, and they have specific benefits.

Think of it like this: All dogs are the same genus and species, **Canis familiaris**. But different breeds may be nothing alike. For bacteria, **strain** can be thought of as the breed. Not knowing the strain would be like adopting a dog without knowing the breed. A Chihuahua is very different from a Great Dane!

**LE:** Probiotics sold as dietary supplements may contain different amounts of **colony forming units** (CFUs), as well as a variety of strains. Is more always better?

**Dr. Swick:** No. That’s a common misconception. The **amount** and **specific** strains listed on the label should be consistent with what was tested in a study. A larger amount or number of probiotic strains does not mean it’s more effective.

**LE:** People mostly think of probiotics as helping with **digestive** health. But now there are targeted probiotics that can improve conditions as varied such as gum disease, depression, and allergies. How do these work?

**Dr. Swick:** Initially, probiotics were thought to be beneficial only for gastrointestinal health. We now know that specific strains of probiotics are helpful for a variety of conditions. Specific strains have been clinically demonstrated to support a healthy heart, throat, immune response, liver, and even mood.

In general, **condition-specific probiotics** work by supporting an overall healthier microbiome, producing substances that have specific effects,¹ and beneficially influencing immune responses. Targeted probiotics present a meaningful advance for supporting disease prevention and health.

**LE:** Can you give some examples of specific strains and the conditions they benefit?

**Dr. Swick:** Many human mouths are teeming with a type of bacteria, **Streptococcus mutans**, that is a cause of cavities, gingivitis (gum inflammation), and
periodontitis (gum disease). Nearly a third of U.S. adults have untreated tooth decay, and nearly half of those 30 and older have periodontal disease.

In a clinical study, scientists demonstrated that *Streptococcus salivarius M18* was able to decrease the plaque index score and improve other measures of oral health. This is particularly important since we now know that gum disease is associated with other health conditions, including heart disease.

Another interesting application of condition-specific probiotics is in mitigating depression and anxiety. In two randomized controlled trials, participants taking a blend of *Lactobacillus helveticus Rosell-52* and *Bifidobacterium longum Rosell-175* reported significant improvements in mood, stress response, and emotional balance. One human study showed a 50% improvement in depression scores with these two probiotics, and another showed a 55% improvement in anxiety scores. The connection between the gut and brain is an exciting area of active research.

Scientists have also discovered and characterized a probiotic, *Lactobacillus rhamnosus CRL 1505*, that stimulates the immune system in the respiratory tract and gut. In clinical studies, administration of this probiotic strain led to reduction in infection symptoms, infection incidence, and use of antibiotics. The data were so compelling that *Lactobacillus rhamnosus* CRL 1505 was provided to schoolchildren as part of a national nutrition program in Argentina.

As research continues, new targeted probiotics are being developed for conditions such as constipation, and to support longevity.

**LE:** We also hear a lot lately about prebiotics. What are those?

**Dr. Swick:** Prebiotics are basically compounds that serve as “food” to support the growth of probiotics. Most prebiotics are dietary fibers, but not all dietary fibers are considered to be prebiotics.

**LE:** You’ve given us a lot of information. Can you provide the reader with some simple guidelines about how to select appropriate probiotic products?

**Dr. Swick:** Choosing a probiotic can be overwhelming! Here are a few key points to remember:

1. First and foremost, only purchase probiotics that are high quality and backed by science.
2. Ensure that the strain is clearly identified and appropriate for the specific conditions you want to address.
3. Remember that more is not better. The CFUs should be consistent with what was clinically studied.

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

Dr. Swick is the Chief Scientific Officer for Life Extension® and oversees all scientific and product development initiatives. Immediately prior, Dr. Swick was the Vice President of Nutrition Science at Metagenics. Dr. Swick also has deep pharmaceutical industry experience, having performed both scientific and managerial roles at Pfizer for more than 17 years, where he was responsible for drug discovery and research for obesity and atherosclerosis.

Previously, he also served as an Associate Professor at the Nutrition Research Institute at the University of North Carolina at Chapel Hill. Dr. Swick earned his PhD in Nutritional Biochemistry from the University of Wisconsin-Madison and was a Postdoctoral Research Fellow at the Johns Hopkins University School of Medicine and University of North Carolina Lineberger Comprehensive Cancer Center.

---

**References**

**Mega Green Tea Extract** provides powerful beneficial compounds called **catechins** including **EGCG** that support brain and whole-body health.

- EGCG supports new brain cell growth¹
- Promotes brain plasticity²
- Improves cognitive performance³
- Enhances brain wave activity⁴

Each cost-effective bottle lasts over **three months**!

Each **725 mg** capsule of **Mega Green Tea Extract** is standardized to **98% polyphenols** that provide **326 mg** of **EGCG**.

An average cup of green tea contains about **150 mg to 300 mg** of **polyphenols**.⁵ Each capsule of this supplement provides **725 mg** of green tea extract, standardized to **98% polyphenols**. That means you’d have to drink about **3 cups** of green tea to get the same number of polyphenols as **one** capsule of **Mega Green Tea Extract**.

---

**Mega Green Tea Extract Decaffeinated**

Item #00954 • 100 vegetarian capsules

1 bottle $22.50

4 bottles $18 each

**Mega Green Tea Extract Lightly Caffeinated**

Item #00953 • 100 vegetarian capsules

1 bottle $22.50

4 bottles $18 each

---

* EGCG is the acronym for epigallocatechin gallate, which is the polyphenol in green tea that has demonstrated the most robust health benefits.

**References**

Youthful Skin Begins Inside

Zeropollution® is a registered trademark of MONTELOEDER, S.L. Myoceram® is a registered trademark of NIPPN Corporation. Contains rice. Gluten-free.

Taking certain plant-derived nutrients has been shown to produce noticeable improvements in skin health and appearance.

Daily Skin Defense contains nutrients clinically demonstrated to induce a:

3-fold improvement in skin moisturization and 10-fold reduction in the appearance of wrinkle depth compared with placebo.¹

Just one capsule of Daily Skin Defense provides:

- **Rice-derived ceramides** designed to help improve skin moisture.²,³
- **Four Herbal Extracts** to support the skin’s barrier function against environmental factors and reduce appearance of wrinkle depth.¹
- **Vitamin C** to support collagen production and improve the skin’s natural protection against the oxidative effects of UV light.⁴-⁶

Zeropollution® is a registered trademark of MONTELOEDER, S.L. Myoceram® is a registered trademark of NIPPN Corporation. Contains rice. Gluten-free.

References
1. Preprints. 2020, 2020090564.

Item #02423 • 30 vegetarian capsules
1 bottle $24 • 4 bottles $22 each

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
Researchers have discovered that the trillions of bacteria live in our body play a vital role in our overall health.

**FLORASSIST®** probiotics provide specific strains and amounts of beneficial bacteria used in human studies.

These condition specific probiotics target an overall healthy microbiome and improve functional parameters throughout the body.

---

**HEALTHY PROBIOTICS**

- **FLORASSIST® GI with Phage Technology**
  - Provides broad spectrum of healthy bacteria for the digestive tract plus phages that target undesirable intestinal bacterial strains.
  - Item #02125 • 30 liquid vegetarian capsules
  - 1 bottle $24.75
  - 4 bottles $22.50 each

- **FLORASSIST® Heart Health**
  - Supports heart health.
  - Item #01821 • 60 vegetarian capsules
  - 1 bottle $24
  - 4 bottles $21 each

- **FLORASSIST® Prebiotic Chewable**
  - Promotes friendly bacteria.
  - Item #02203 • 60 vegetarian chewable tablets
  - 1 bottle $15
  - 4 bottles $13 each

- **FLORASSIST® Throat Health**
  - Probiotic defense for your throat.
  - Item #01920 • 30 vegetarian lozenges
  - 1 bottle $15
  - 4 bottles $13.50 each

For full descriptions and to order any of these FLORASSIST® products, call 1-800-544-4440 or visit www.LifeExtension.com

---

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.
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.

For full descriptions and to order any of these FLORASSIST® products, call 1-800-544-4440 or visit www.LifeExtension.com

**FLORASSIST® Oral Hygiene**
- Supports healthy bacteria in gums.

Item #02120 - 30 vegetarian lozenges
1 bottle $15
4 bottles $13 each

**FLORASSIST® Immune and Nasal Defense**
- Balances immune response to seasonal changes.

Item #02208 - 30 vegetarian capsules
1 bottle $18
4 bottles $16 each

**FLORASSIST® Mood Improve**
- Positively influences the nervous system for healthy mood.

Item #02250 - 30 vegetarian capsules
1 bottle $23.25
4 bottles $21 each

**FLORASSIST® Liver Restore™**
- Supports healthy liver function.

Item #02402 - 60 vegetarian capsules
1 box $15
4 boxes $13.50 each

BLIS K12® is the registered trademark of BLIS Technologies Limited BLISTM and BLIS M18TM are trademarks of Blis Technologies Limited and the subject of USA patent no. 7226590.

PretiX™ is a trademark of AIDP Inc. Immuno-LP20® is a registered trademark of House Foods Group Inc.

EpiCor® is a registered trademark of Embia Health Sciences, L.L.C. L-92® is a registered trademark of Asahi Calpis Wellness Co., Ltd., Tokyo, Japan.

PXN® is a registered trademark of ADM Protexin Limited.

All rights reserved.
These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
What is Tart Cherry?

BY CHANCELLOR FALOON

Tart cherries, also known as sour cherries, contain compounds, including a class of polyphenols known as anthocyanins, that help reduce inflammation and oxidative stress.¹ ²

Research has shown that tart cherries can relieve arthritis pain, boost cognition, improve cardiovascular health, benefit endurance athletes, and target the underlying factors of gout.¹ ³

Tart cherries have been widely used to boost recovery and performance for athletes.

A 2020 meta-analysis of trials on endurance athletes confirmed that tart cherry concentrate intake significantly improves endurance exercise performance.⁴
WHAT IS TART CHERRY?

In recent randomized controlled trials, those drinking tart cherry juice had improvements in a variety of areas:

- Healthy older adults who drank two cups (16 oz) of tart cherry juice daily for 12 weeks had improved scores on tests of cognitive abilities, including reaction time, a learning task, and spatial working memory compared to baseline.⁵

- In subjects 50 and older suffering from insomnia, drinking one cup (8 oz) of tart cherry juice twice daily for two weeks led to increased sleep time and sleep efficiency. Researchers noted that tart cherry juice prevented the degradation of tryptophan, an essential amino acid that may help treat sleep disorders.⁶

- In overweight or obese individuals, one cup (8 oz)/day of tart cherry juice reduced serum uric acid concentration by 19.2% and C-reactive protein (a marker of inflammation) by 19.4%.⁷ Elevated blood uric acid is the underlying cause of gout, which is a painful form of arthritis.⁸

Tart cherries and their juice are naturally high in sugar. Many people prefer to avoid this sugar load and take tart cherry extract instead.

In one study, taking tart cherry extract was 15.4% more effective at reducing the odds of a gout attack than eating cherries.⁹

A wealth of data shows that tart cherry extract can provide a wide range of health benefits. A potential new use for tart cherry extract has been uncovered.

When components of tart cherry were tested on oral epithelial cells (cells that line the surfaces of the mouth), they improved the protective barrier function. Tart cherry also reduced the ability of oral pathogens to clump together in sticky white plaque that forms on teeth and gums.¹⁰

In a different study, tart cherry extract reduced growth and activity of the bacteria that are the main cause of gingivitis (inflammation of the gums).¹¹,¹² These studies suggest that tart cherry extract fights oral pathogens and may help prevent and treat oral plaque.

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

References

Ginseng has long been used to fight mental and physical fatigue.

One daily capsule of Ginseng Energy Boost delivers a 200 mg dose of Asian ginseng, with no caffeine or other stimulant.

This proprietary ginseng extract is fermented to boost your body’s absorption of its biologically active compounds.

Make every day a vibrant, high-energy day!*

* Ginseng is an adaptogenic herb that can promote healthy energy production, support endurance, balance oxidative processes, support the natural ability to manage stress, and encourage positive mood.

GS15-4™ is a trademark of ILHWA N.A.
YOUR BONE HEALTH ... NOW BOOSTED

Bone Restore with Vitamin K2 combines skeletal-strengthening nutrients in one highly absorbable formula.

For full product description and to order Bone Restore with Vitamin K2, call 1-800-544-4440 or visit LifeExtension.com

Item #01727 • 120 capsules
1 bottle $18
4 bottles $16.50 each

Caution: Those taking the anticoagulant drug Coumadin® (warfarin) should use Bone Restore without vitamin K2.
Fruitex B® and OsteoBoron® are registered trademarks of VDF Futureceuticals, Inc. U.S. patent #5,962,049. DimaCal® and TRAACS® are registered trademarks of Albion Laboratories, Inc., U.S. patent 6,706,904.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
STRONG SUPPORT FOR SORE MUSCLES

After Exercise and Everyday Exertion

Benefits of TART CHERRY include:1-5

• Rapid muscle recovery after exercise.
• Fast relief from the minor aches, discomfort, and stiffness following everyday activities.

ANTHOCYANINS

Anthocyanins—the powerful flavonoids found in dark-pigmented fruit—have been studied for their many advantages, including heart, cellular, and cognitive health.6-8

Tart Cherry with CherryPURE® matches the anthocyanin dose used in clinical trials.2,5

Life Extension® offers 100% natural Tart Cherry with CherryPURE®.

References

CherryPURE® is a registered trademark of Shoreline Fruit, LLC.

Item #02023 • 60 vegetarian capsules
1 bottle $15 • 4 bottles $14 each

For full product description and to order Tart Cherry Extract with CherryPURE®, call 1-800-544-4440 or visit www.LifeExtension.com

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
**ACTIVE LIFESTYLE & FITNESS**

01529 Creatine Capsules  
02318 Keto Brain and Body Boost  
02020 Super Carnosine  
02023 Tart Cherry with CherryPURE®  
02146 Wellness Bar–Chocolate Brownie  
02147 Wellness Bar–Cookie Dough  
02020 Super Carnosine  
02023 Tart Cherry with CherryPURE®  
02146 Wellness Bar–Chocolate Brownie  
02147 Wellness Bar–Cookie Dough  
02246 Wellness Code® Advanced Whey Protein Isolate Vanilla  
02221 Wellness Code® Muscle Strength & Restore Formula  
02127 Wellness Code® Plant Protein Complete & Amino Acid Complex  
02261 Wellness Code® Whey Protein Concentrate Chocolate  
02260 Wellness Code® Whey Protein Concentrate Vanilla  
02243 Wellness Code® Whey Protein Isolate Chocolate  
02242 Wellness Code® Whey Protein Isolate Vanilla  

**AMINO ACIDS**

01039 Arginine & Ornithine Capsules  
00038 Arginine Ornithine Powder  
01253 Branched Chain Amino Acids  
01671 D,L-Phenylalanine Capsules  
01532 L-Carnitine  
00345 L-Glutamine  
00141 L-Glutamine Powder  
01678 L-Lysine  
00133 Taurine Powder  
00326 Tyrosine Tablets  

**BLOOD PRESSURE & VASCULAR SUPPORT**

01824 Advanced Olive Leaf Vascular Support  
02004 Arterial Protect  
70000 Blood Pressure Monitor Arm Cuff  
02497 Endothelial Defense™ Pomegranate Plus  
02320 NitroVasc® Boost  
00984 Optimal BP Management  
01953 Pomegranate Complete  
00956 Pomegranate Fruit Extract  
02024 Triple Action Blood Pressure AM/PM  
02102 VenoFlow™  

**BONE HEALTH**

01726 Bone Restore  
02123 Bone Restore Chewable Tablet  
02416 Bone Restore Elite with Super Potent K2  
01727 Bone Restore with Vitamin K2  
01725 Bone Strength Collagen Formula  
00313 Bone-Up™  
01963 Calcium Citrate with Vitamin D  
01506 Dr. Strum’s Intensive Bone Formula  
02417 Mega Vitamin K2  
01476 Strontium Caps  
02422 Vegan Vitamin D3  

**BRAIN HEALTH**

01524 Acetyl-L-Carnitine  
01974 Acetyl-L-Carnitine Arginate  
02419 B12 Elite  
02321 Cognitex® Basics  
02396 Cognitex® Elite  
02397 Cognitex® Elite Pregnenolone  
01540 DMAE Bitartrate  
02006 Dopa-Mind™  
02413 Dopamine Advantage  
02212 Focus Tea™  
01658 Ginkgo Biloba Certified Extract™  
01527 Huperzine A  
00020 Lecithin  

**CHOLESTEROL MANAGEMENT**

01828 Advanced Lipid Control  
01359 Cho-Less™  
01910 CHOL-Support™  
01030 Red Yeast Rice  
01304 Theaflavins Standardized Extract  
00372 Vitamin B3 Niacin Capsules  

**DIGESTION SUPPORT**

53348 Betaine HCl  
54160 Black Vinegar  
02412 Bloat Relief  
30747 Digest RC*  
07136 Effervescent Vitamin C - Magnesium Crystals  
02021 Enhanced Super Digestive Enzymes  
02022 Enhanced Super Digestive Enzymes and Probiotics  
02033 EsophaCool™  
01737 Esophageal Guardian  
01706 Extraordinary Enzymes  
02100 Gastro-Ease™  
01122 Ginger Force™  
00605 Regimint  
01386 TruFiber®  

**ENERGY MANAGEMENT**

01628 Adrenal Energy Formula • 60 veg capsules  
01630 Adrenal Energy Formula • 120 veg capsules  
00972 D-Ribose Powder  
01473 D-Ribose Tablets  
01900 Energy Renew  
01544 Forskolin  
01805 Ginseng Energy Boost  
00668 Metabolic Advantage Thyroid Formula™  
01869 Mitochondrial Basics with PQQ  
01868 Mitochondrial Energy Optimizer with PQQ  
01904 NAD+ Cell Regenerator™ • 100 mg, 30 veg capsules  
02344 NAD+ Cell Regenerator™ 300 mg, 30 veg capsules  
02348 NAD+ Cell Regenerator™ and Resveratrol  
01500 PQQ Caps • 10 mg  
01647 PQQ Caps • 20 mg  
00889 Rhodiola Extract  
02003 Triple Action Thyroid  

**EYE HEALTH**

01923 Astaxanthin with Phospholipids  
00893 Brite Eyes III  
02323 Digital Eye Support  
01514 Eye Pressure Support with Mirtogenol®  
01992 MacuGuard® Ocular Support with Saffron  
01993 MacuGuard® Ocular Support with Saffron & Astaxanthin  
01873 Standardized European Bilberry Extract  
01918 Tear Support with MaquiBright®  

**FISH OIL & OMEGAS**

02311 Clearly EPA/DHA Fish Oil  
00463 Flaxseed Oil  
01937 Mega EPA/DHA  
02218 Mega GLA Sesame Lignans  
01983 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract  
01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 120 softgels
01985 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 60 enteric coated softgels
01984 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 120 enteric coated softgels
01986 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract - 240 softgels
01812 Provinol® Purified Omega-7
01640 Vegetarian DHA

FOOD
02008 California Estate Extra Virgin Olive Oil
02170 Rainforest Blend Decaf Ground Coffee
02169 Rainforest Blend Ground Coffee
02171 Rainforest Blend Whole Bean Coffee
00438 Stevia™ Organic Liquid Sweetner
00432 Stevia™ Sweetener

GLUCOSE MANAGEMENT
01503 CisSulin® with InSea® and Crominex® 3+
01620 CoffeeGenic® Green Coffee Extract
02122 Glycemic Guard™
00925 Mega Benfotiamine
01803 Tri Sugar Shield®

HEART HEALTH
01066 Aspirin (Enteric Coated)
01842 BioActive Folate & Vitamin B12 Caps
01700 Cardio Peak™
02121 Homocysteine Resist
02018 Optimized Carnitine
01949 Super-Absorbable CoQ10 Ubiquinone with d-Limonene - 50 mg, 60 softgels
01951 Super-Absorbable CoQ10 Ubiquinone with d-Limonene - 100 mg, 60 softgels
01929 Super Ubiquinol CoQ10
01427 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 50 mg, 30 softgels
01425 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 100 mg, 100 softgels
01437 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 100 mg, 30 softgels
01426 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 100 mg, 60 softgels
01431 Super Ubiquinol CoQ10 with Enh Mitochondrial Support™ - 200 mg, 30 softgels
01733 Super Ubiquinol CoQ10 with PQQ
01859 TMG Liquid Capsules
00349 TMG Powder

HORMONE BALANCE
00454 DHEA - 15 mg, 100 capsules
00335 DHEA - 25 mg, 100 capsules
00882 DHEA - 50 mg, 60 capsules
00607 DHEA - 25 mg, 100 vegetarian dissolves in mouth tablets
01689 DHEA - 100 mg, 60 veg capsules
02368 Optimized Broccoli and Cruciferous Blend
00302 Pregnenolone - 50 mg, 100 capsules
00700 Pregnenolone - 100 mg, 100 capsules
01468 Triple Action Cruciferous Vegetable Extract
01469 Triple Action Cruciferous Vegetable Extract and Resveratrol

IMMUNE SUPPORT
02411 5 Day Elderberry Immune
00681 AHCC®
02302 Bio-Quercetin®
02410 Black Elderberry + Vitamin C
01961 Enhanced Zinc Lozenges
01704 Immune Modulator with Tinofend®

INFLAMMATION MANAGEMENT
01639 5-LOX Inhibitor with AprèsFlex®
02324 Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones
01709 Black Cumin Seed Oil
02310 Black Cumin Seed Oil and Curcumin Elite™
00202 Boswellia
02467 Curcumin Elite™ Turmeric Extract - 30 veg capsules
02407 Curcumin Elite™ Turmeric Extract - 60 veg capsules
01804 Cytokine Suppress® with EGCG
02223 Pro-Resolving Mediators
00318 Serrafazyme
01203 Specially-Coated Bromelain
00407 Super Bio-Curcumin® Turmeric Extract
01254 Zyflamend™ Whole Body

JOINT SUPPORT
02404 Arthro-Immune Joint Support
02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
01617 ArthroMax® with Theaflavins & AprèsFlex®
02138 ArthroMax® Elite
00965 Fast-Acting Joint Formula
00522 Glucosamine/Chondroitin Capsules
02420 Glucosamine Sulfate
01600 Krill Healthy Joint Formula
01050 Krill Oil
00451 MSM (Methylsulfonylmethane)
02231 NT2 Collagen™

KIDNEY & BLADDER SUPPORT
00862 Cran-Max® Cranberry Whole Fruit Concentrate
01424 Optimized Cran-Max® with Ellirose™
01921 Uric Acid Control
01209 Water-Soluble Pumpkin Seed Extract

LIVER HEALTH & DETOXIFICATION
01922 Advanced Milk Thistle - 60 softgels
01925 Advanced Milk Thistle - 120 softgels
02240 Anti-Alcohol Complex
01651 Calcium D-Gluconate
00550 Chlorella
01571 Chlorophyllin
01522 Milk Thistle
00550 Chlorella
01571 Chlorophyllin
01541 Glutathione, Cysteine & C
01393 HepatoPro
01608 Liver Efficiency Formula
01534 N-Acetyl-L-Cysteine
00342 PectaSol-C® Modified Citrus Pectin Powder
01080 PectaSol-C® Modified Citrus Pectin Capsules
01884 Silymarin
02361 SOD Booster
00955 Immune Protect with PARACTIN®
02005 Immune Senescence Protection Formula™
29727 Kinoko® Gold AHCC
24404 Kinoko® Platinum AHCC
00316 Kyolic® Garlic Formula 102
00789 Kyolic® Reserve
01681 Lactoferrin (Apolactoferrin) Caps
02426 Mushroom Immune with Beta Glucans
01903 NK Cell Activator™
01394 Optimized Garlic
01309 Optimized Quercetin
01811 Peony Immune
00525 ProBoost Thymic Protein A
01708 Reishi Extract Mushroom Complex
01906 Standardized Cistanche
13685 Ten Mushroom Formula®
01097 Ultra Soy Extract
01561 Zinc Lozenges

PRODUCTS
02361 SOD Booster
LONGEVITY & WELLNESS
00457 Alpha-Lipoic Acid
01625 AppleWise
02414 Bio-Fisetin
01214 Blueberry Extract
01438 Blueberry Extract and Pomegranate
02270 DNA Protection Formula
02405 Endocannabinoid System Booster
02119 GEROPROTECT® Ageless Cell™
02415 GEROPROTECT® Autophagy Renew
02133 GEROPROTECT® Ageless Cell™
02401 GEROPROTECT® Stem Cell
02211 Grapeseed Extract
00954 Mega Green Tea Extract (decaffeinated)
00953 Mega Green Tea Extract (lightly caffeinated)
01513 Optimized Fucoidan with Maritech® 926
02230 Optimized Resveratrol
01637 Pycnogenol® French Maritime Pine Bark Extract
02210 Resveratrol
00070 RNA (Ribonucleic Acid)
02301 Senolytic Activator®
01208 Super R-Lipoic Acid
01919 X-R Shield

MEN'S HEALTH
02209 Male Vascular Sexual Support
00455 Mega Lycopene Extract
02306 Men's Bladder Control
01789 PalmettoGuard® Saw Palmetto and Beta-Sitosterol
01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula
01837 Pomi-T®
01373 Prelox® Enhanced Sex for Men
01940 Super MiraForte with Standardized Lignans
01909 Triple Strength ProstaPollen™
02029 Ultra Prostate Formula

MINERALS
01661 Boron
02107 Extend-Release Magnesium
30731 Ionic Selenium
01677 Iron Protein Plus
02403 Lithium
01459 Magnesium Caps
01682 Magnesium (Citrate)
01328 Only Trace Minerals
01504 Optimized Chromium with Crominex® 3+
02309 Potassium with Extend-Release Magnesium
01740 Sea-Iodine™
01879 Se-Methyl L-Selenocysteine
01778 Super Selenium Complex
00213 Vanadyl Sulfate
01813 Zinc Caps

MISCELLANEOUS
00577 Potassium Iodide
00657 Solarshield® Sunglasses

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

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

NERVE & COMFORT SUPPORT
02202 ComfortMAX™
02303 PEA Discomfort Relief

PERSONAL CARE
01006 Biosil™ • 5 mg, 30 veg capsules
01007 Biosil™ • 1 fl oz
00321 Dr. Proctor's Advanced Hair Formula
00320 Dr. Proctor's Shampoo
02322 Hair, Skin & Nails Collagen Plus Formula
01128 Life Extension Toothpaste
00408 Venotone
00409 Xyliwhite Mouthwash
02304 Youthful Collagen
02252 Youthful Legs

PET CARE
01932 Cat Mix
01931 Dog Mix

PROBIOTICS
01622 Bifido GI Balance
01825 FLORASSIST® Balance
02125 FLORASSIST® GI with Phage Technology
01821 FLORASSIST® Heart Health
02250 FLORASSIST® Mood Improve
02208 FLORASSIST® Immune & Nasal Defense
02120 FLORASSIST® Oral Hygiene
02203 FLORASSIST® Prebiotic
01920 FLORASSIST® Throat Health
02400 FLORASSIST® Winter Immune Support
52142 Jarro-Dophilus® for Women
00056 Jarro-Dophilus EPS® • 60 veg capsules
21201 Jarro-Dophilus EPS® • 120 veg capsules
01038 Theralac® Probiotics
01389 TruFlora® Probiotics

SKIN CARE
80157 Advanced Anti-Glycation Peptide Serum
80165 Advanced Growth Factor Serum
80170 Advanced Hyaluronic Acid Serum
80154 Advanced Lightening Cream
80155 Advanced Peptide Hand Therapy
80175 Advanced Probiotic-Fermented Eye Serum
80177 Advanced Retinol Serum
80152 Advanced Tripeptide Serum
80140 Advanced Under Eye Serum with Stem Cells
80137 All-Purpose Soothing Relief Cream
80139 Amber Self MicroDermAbrasion
80118 Anti-Aging Mask
80151 Anti-Aging Rejuvenating Face Cream
80153 Anti-Aging Rejuvenating Scalp Serum
80179 Brightening Peptide Serum
80176 Collagen Boosting Peptide Cream
**PRODUCTS**

80156 Collagen Boosting Peptide Serum
02408 Collagen Peptides for Skin & Joints
80169 Cucumber Hydra Peptide Eye Cream
02423 Daily Skin Defense
80141 DNA Support Cream
80163 Eye Lift Cream
80123 Face Rejuvenating Anti-Oxidant Cream
80109 Hyaluronic Facial Moisturizer
80110 Hyaluronic Oil-Free Facial Moisturizer
80138 Hydrating Anti-Oxidant Facial Mist
00661 Hydroderm
55495 Intensive Moisturizing Cream
80103 Lifting & Tightening Complex
80168 Melatonin Advanced Peptide Cream
80114 Mild Facial Cleanser
80172 Neck Rejuvenating Anti-Oxidant Cream
80174 Purifying Facial Mask
80150 Renewing Eye Cream
80142 Resveratrol Anti-Oxidant Serum
01938 Shade Factor™
02129 Skin Care Collection Anti-Aging Serum
02130 Skin Care Collection Day Cream
02131 Skin Care Collection Night Cream
80166 Skin Firming Complex
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Skin Restoring Ceramides
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Skin Restoring Ceramides
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Skin Restoring Ceramides
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Skin Restoring Ceramides
80129 Vitamin C Lip Rejuvenator
80129 Vitamin C Serum
80136 Vitamin D Lotion
80102 Vitamin K Cream

**SLEEP**

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

**VITAMINS**

01533 Ascorbyl Palmitate
00920 Benfotiamine with Thiamine
00664 Beta-Carotene
01945 BioActive Complete B-Complex
00102 Biotin
00084 Buffered Vitamin C Powder
02229 Fast-C® and Bio-Quercetin Phytosome
02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
02070 Gamma E Mixed Tocopherol & Tocotrienols
01913 High Potency Optimized Folate
01674 Inositol Caps
02244 Liquid Vitamin D3 50 mcg (2000 IU)
02232 Liquid Vitamin D3 (Mint) 50 mcg (2000 IU)
01936 Low-Dose Vitamin K2
00065 MK-7
00373 No Flush Niacin
01939 Optimized Folate (L-Methylfolate)
01217 Pyridoxal 5'-Phosphate Caps
01400 Super Absorbable Tocotrienols
02334 Super K
02335 Super K Elite
01863 Super Vitamin E
02028 Vitamin B5 (Pantothenic Acid)
01535 Vitamin B6
00361 Vitamin B12 Methylcobalamin
01536 Vitamin B12 Methylcobalamin 1 mg, 60 veg lozenges
01537 Vitamin B12 Methylcobalamin 5 mg, 60 veg lozenges
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 60 veg tablets
02227 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets
01753 Vitamin D3 25 mcg (1000 IU), 90 softgels
01751 Vitamin D3 25 mcg (1000 IU), 250 softgels
01713 Vitamin D3 125 mcg (5000 IU), 60 softgels
01718 Vitamin D3 175 mcg (7000 IU), 60 softgels
01758 Vitamin D3 with Sea-Iodine™ 1,000 mg, 60 veg tablets
02228 Vitamin C and Bio-Quercetin Phytosome 1,000 mg, 250 veg tablets

**WEIGHT MANAGEMENT & BODY COMPOSITION**

00658 7-Keto® DHEA Metabolite 25 mg, 100 capsules
02479 7-Keto® DHEA Metabolite 100 mg, 60 veg capsules
01509 Advanced Anti-Adipocyte Formula
01807 Advanced Appetite Suppress
02207 AMPK Metabolic Activator
01492 Calorie Control Complex with Phase 3™ and African Mango
02478 DHEA Complete
01738 Garcinia HCA
01292 Integra-Lean®
01908 Mediterranean Trim with Sinetrol™ -XPur
01432 Optimized Saffron
00818 Super CLA Blend with Sesame Lignans
01902 Waist-Line Control™
02151 Wellness Code® Appetite Control

**WOMEN’S HEALTH**

01942 Breast Health Formula
01626 Enhanced Sex for Women 50+
01894 Estrogen for Women
01064 Femmenessence MacaPause®
02204 Menopause 731™
02319 Prenatal Advantage
01441 Progesta-Care®
01649 Super-Absorbable Soy Isoflavones
Regain Your Youthful Energy

Energize every cell in your body with carnosine, R-lipoic acid, benfotiamine, taurine, PQQ, and more.

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

Item #01868 • 120 vegetarian capsules
1 bottle $51 • 4 bottles $45 each

Bio-Enhanced® is a registered trademark of Geronova Research, Inc.

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.
PROSTATE HEALTH
The best way to keep You in the picture.

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

• Support healthy urination
• Promote healthy prostate function
• Support healthy prostate cell division

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

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

These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.
IN THIS EDITION OF LIFE EXTENSION® MAGAZINE

7 WHY VITAMIN STUDIES SOMETIMES FAIL
Eye-opening reports reveal how deficiencies in magnesium and vitamin K can negate the benefits of vitamin D.

26 WHAT HAS SCIENTISTS EXCITED ABOUT NAD+?
Nicotinamide riboside increases cellular NAD+ and extends lifespan by 5% in animal studies.

36 IMMUNE-BOOSTING PROPERTIES OF MUSHROOMS
A blend of three mushrooms and beta glucans improve immune function.

46 ASHWAGANDHA'S BRAIN BENEFITS
Ashwagandha enhances brain function and may defend against cognitive decline.

56 THE VITAMIN D-MAGNESIUM CONNECTION
Magnesium and vitamin D work together to enhance each other’s benefits.

68 PREVENT SUN DAMAGE FROM THE INSIDE OUT
Orally ingested nutrients decrease UV-radiation-induced DNA mutations by 84%.