LIFE EXTENSION®
The Science of a Healthier Life®
September/October 2021

FEATURE ARTICLES

Plant Pigments Protect Against Vision Loss

PLUS PAGE 18: *A Healthier Microbiome*

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

Item **#02314**
120 capsules (two-month supply)

Two-Per-Day Multivitamin

Item **#02315**
120 tablets (two-month supply)

Each bottle provides a two-month supply.

These products are available at fine health food stores everywhere.

GLUTEN FREE

NON GMO LE CERTIFIED

Support Connections Between Your Neurons

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 support **synaptic density** and other structural components of the brain.*

Item #01603
90 vegetarian capsules

GLUTEN FREE
NON GMO LE CERTIFIED

Item #02032
Net Wt. 93.35 g
(0.206 lb. or 3.293 oz.)

These products are available at fine health food stores everywhere.

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

BEAT BELLY FAT WITH AMPK

Studies show that *increasing* AMPK activity encourages cells to stop storing fat.

AMPK Metabolic Activator helps trigger cellular AMPK, enabling your body to burn unwanted fat—particularly around your abdomen.

Item #02207

30 vegetarian tablets

This product is available at fine health food stores everywhere.

GLUTEN FREE

1 DAILY

NON GMO LE CERTIFIED

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

Share a Longer Life

GLUTEN FREE

1 DAILY

NON GMO
LE CERTIFIED

Selenium is common among world's longest-living people.

Selenium promotes the body's production of glutathione, a potent cellular antioxidant. It also encourages healthy cell division, thyroid health and immune function.

To ensure you get enough, we've combined three complementary forms of this mineral with vitamin E for additional antioxidant protection. Super Selenium Complex. **Share a longer life**.

Item #01778

200 mcg • 100 vegetarian capsules

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

This product is available at fine health food stores everywhere.

SUPPORTS HEART HEALTH

GLUCOSAMINE

BEYOND JOINT HEALTH

Glucosamine has been used for decades to support **joint function** and **protect cartilage**.

New studies reveal it may also promote **heart health** and beneficial **autophagy**.

Large cohort studies showed that people who took **glucosamine** were more likely to live longer, healthier lives.[1-4]

Each capsule of this new formula provides **750 mg** of **glucosamine**.

HIGH DOSE
Glucosamine Sulfate

Item #02420

750 mg • 60 capsules

GLUTEN FREE

NON GMO LE CERTIFIED

References

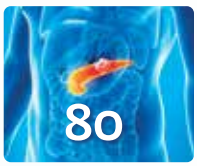
1. *Eur J Epidemiol.* 2012 Aug;27(8):593-603.
2. *J Am Board Fam Med.* 2020 Nov-Dec;33(6):842-7.
3. *Ann Rheum Dis.* 2020 Jun;79(6):829-36.
4. *Am J Clin Nutr.* 2010 Jun;91(6):1791-800.

This product is available at fine health food stores everywhere.

LIFE EXTENSION®
The Science of a Healthier Life®
SEPTEMBER/OCTOBER 2021

CONTENTS

REPORTS



DEPARTMENTS

LIFE EXTENSION®

The Science of a Healthier Life®

LifeExtensionRetail.com September/October 2021

LIFE EXTENSION (ISSN 1524-198X) September/October 2021 ©2021 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338.LE Publications, Inc. All rights reserved. Published 13 times a year. Subscription rate: $40 per year in the United States. US $47 in Canada. US $60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA. The articles in this magazine are intended for informational purposes only. They are not intended to replace the attention or advice of a physician or other health-care professional. Anyone who wishes to embark on any dietary, drug, exercise, or other lifestyle change intended to prevent or treat a specific disease or condition should first consult with and seek clearance from a qualified health-care professional. LEGAL NOTICE: Health claims contained in articles and advertisements in this publication have not been approved by the FDA with the exception of FDA-approved, qualified health claims for calcium, antioxidant vitamins, folic acid and EPA and DHA omega-3 fatty acids, and selenium as noted where applicable. *Life Extension® Magazine* does not endorse any of the businesses or the products and/or services that may appear in advertisements for non-Life Extension branded products or services contained in it, except to state that they are advertisers who may have paid Life Extension for placement of an advertisement in this publication. Life Extension disclaims any and all responsibilities or warranties as to the accuracy of information contained in advertisements for non-Life Extension branded products or services. For Canadian customers send change of address information and blocks of undeliverable copies to P.O. Box 1051, Fort Erie, ON L2A 6C7.

H_2O Scams Exposed!

FREE Report

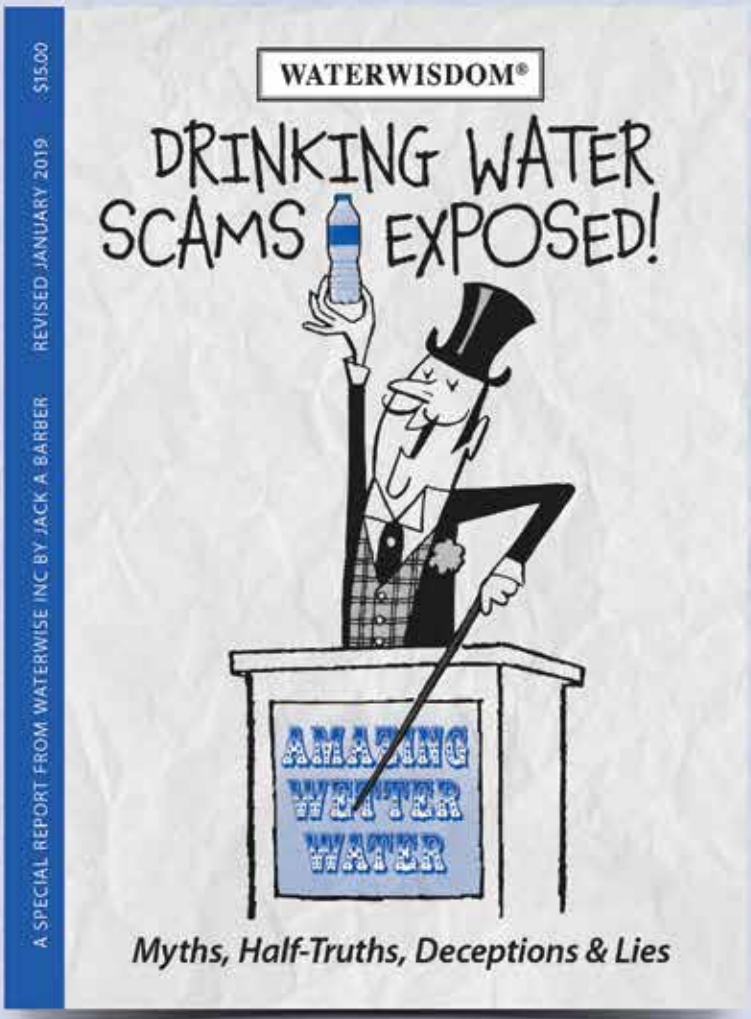
$15.00 value

Get the lowdown on bogus water scams… *oxygenated, structured, energized, alkalized and micro-clustered.*

Truth revealed *about distilled, mineral, spring, filtered, bottled, reverse osmosis, well and ordinary "purified" water. Discover the amazing Waterwise system that* ***guarantees you consistent water purity.***

Learn about the wise alternative to buying bottled and ***save 70% or more.***

Drink the purest… ***you should consume about 2,920 glasses*** *(182 gallons) every year—be water wise!*



Waterwise water purifiers are recommended by the following:

Dr. Russell Blaylock, Dr. Patricia Bragg, Dr. Ted Broer, Dr. Michael Colgan, Dr. David Klein, Dr. Monte Kline, Dr. Bill Misner, Dr. Keith Nemec, Dr. Scott Senne, Dr. Varah Siedlecki, Dr. David Williams, *and many more…*

Call **800-874-9028** Ext 750
Visit **waterscamsreport.net**

☑ **YES!** *Please rush my* ***FREE*** *Waterwisdom Report & Catalog… No Cost/No Obligation*

NEXT

Name _____

Address _____

City _____ State ____ Zip _____

WATERWISE®
Purity Since 1977
Purification Systems

Mail to: Waterwise Inc • PO Box 494000 Leesburg FL 34749

MEDICAL ADVISORY BOARD

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Ronald L. Shuler, BS, DDS, CCN, LN, is involved in immunoncology for the prevention and treatment of cancer, human growth hormone secretagogues, and osteoporosis. He is 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 Maharaj Institute of Immune Regenerative Medicine, and is regarded as one of the world's foremost experts on adult stem cells. He received his medical degree in 1978 from the University of Glasgow Medical School, Scotland. He completed his internship and residency in Internal Medicine and Hematology at the University's Royal Infirmary.

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

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

Michael D. Ozner, MD, FACC, FAHA, is a board-certified cardiologist who specializes in cardiovascular disease prevention. He serves as medical director for the Cardiovascular Prevention Institute of South Florida and is a noted national speaker on heart disease prevention. Dr. Ozner is also author of 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.

HIGHLY PURIFIED

Fish Oil

EPA/DHA FISH OIL + SESAME LIGNANS + OLIVE EXTRACT + KRILL + ASTAXANTHIN

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

Item #01988
120 softgels

Super Omega-3 provides components found in **Mediterranean diets**, including **sesame lignans** to support the stability of **DHA** in the blood.

GLUTEN FREE
NON GMO LE CERTIFIED

EPA/DHA FISH OIL + SESAME LIGNANS + OLIVE EXTRACT

IFOS™

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

Item #01982
120 softgels

These products are available at fine health food stores everywhere.

In the News

Probiotic Use Associated with Fewer Upper Respiratory Tract Symptoms

Findings from a study presented at Digestive Disease Week® 2021 revealed an association between the use of **probiotics** and a reduction in upper respiratory tract symptoms among older and overweight men and women.*

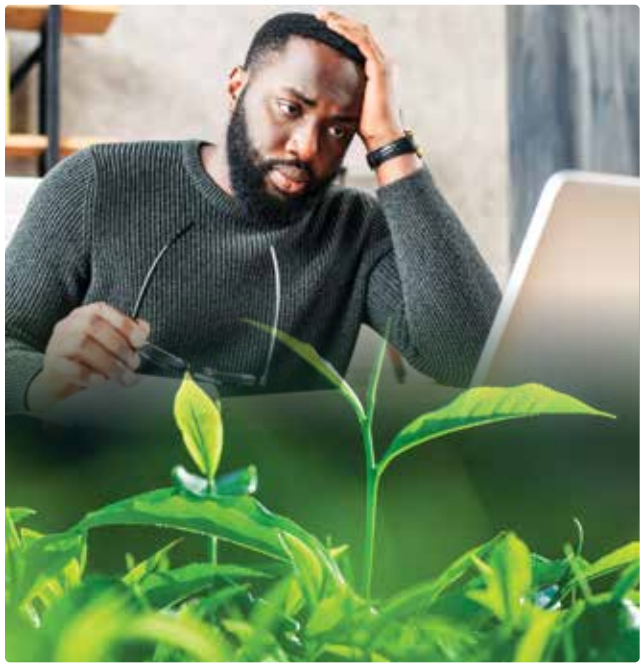
The research team reviewed diary entries completed by the subjects during the trial to determine the presence of upper respiratory symptoms that included sore throat, wheezing, and coughing.

After one to two weeks of supplementation, subjects who received probiotics exhibited a delay in the time it took to record their first upper respiratory tract symptoms.

At the end of the study, there was a **27%** lower incidence of upper respiratory tract symptoms reported by probiotic-supplemented participants in comparison with those who received a **placebo**.

Editor's Note: The benefit of probiotics supplementation was greatest among those people who were at least 45 years of age, or who were obese.

* *Digestive Disease Week®* 2021. May 23.



Magnesium, B Vitamins, Green Tea, Rhodiola, Manage Stress

An article in *Nutritional Neuroscience* reported an improved response to the effects of social stress following supplementation with **magnesium**, **B vitamins**, **green tea**, and **rhodiola** in a trial involving moderately stressed men and women.*

Participants received a placebo or one of three nutrient combinations. The first treatment group received magnesium, vitamin B6, vitamin B12, folate, green tea extract, and rhodiola extract. The second group was given magnesium, B vitamin complex, and rhodiola extract, and the third group received magnesium, B vitamin complex, and green tea extract.

After receiving the supplements, the participants underwent a social-stress-inducing test, and resting state EEG was administered.

Combined treatment with magnesium, B vitamin complex, green tea, and rhodiola was associated with a significant increase in theta waves as measured by EEG, indicating a relaxed, alert state. Participants in this group reported less subjective stress, anxiety, and disturbed mood.

Editor's Note: "There is a significant practical **benefit of a non-pharmaceutical** method of reducing the negative impact of stress, considering the associated profound detriment to the quality of life of individuals and substantial social and economic societal costs," the authors stated.

* *Nutr Neurosci.* 2021 Apr 26;1-15.

Women Needing Knee Replacement Shown to have Vitamin D Deficiency

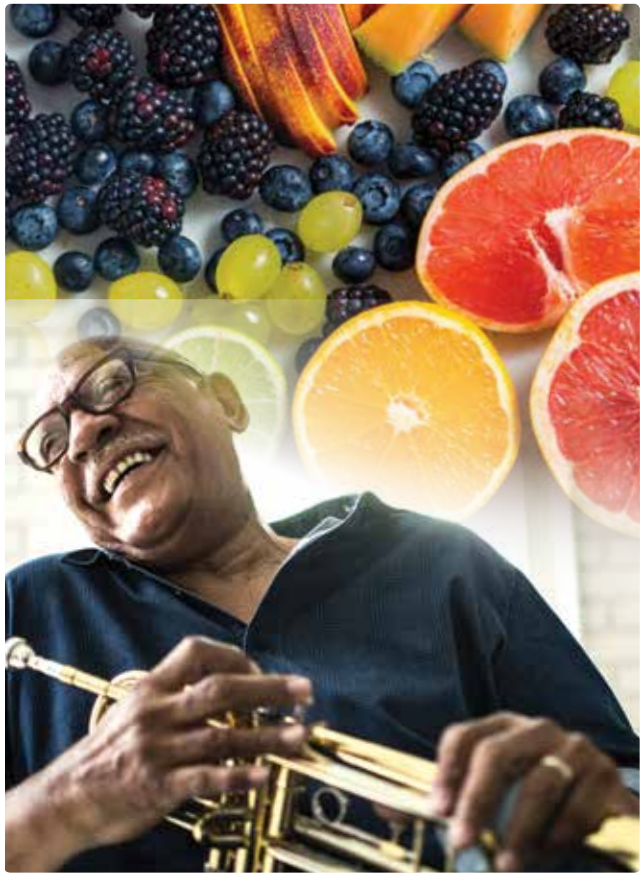
Having enough vitamin D may not only help prevent some pain associated with total knee (replacement) surgery but could help to prevent the condition in the first place, according to a study published in *Menopause*.*

The research included 226 postmenopausal women scheduled for total knee replacement who had 25-hydroxyvitamin D levels of less than **30 ng/mL** or moderate levels of *at least* **30 ng/mL**.

Of the women needing knee replacement, **67%** had less than **30 ng/mL** of ***25-hydroxyvitamin D***.

Editor's Note: In addition to deficient levels of vitamin D, smoking and having a high body mass index (BMI) were independent risk factors for experiencing moderate to severe pain following knee replacement surgery.

* *Menopause.* 2021 May 5.



Higher Dietary Antioxidant Intake Associated with Lower Cognitive Impairment

Among older individuals who consumed more antioxidants, there was a lower risk of cognitive impairment later in life, a study in *The Journals of Gerontology® Series A* reported. *

Cognitive function was evaluated **20.2 years** after the beginning of the study in 1993.

Among those whose Comprehensive Dietary Antioxidant Index Scores placed them among the top **25%** of participants, the odds for developing cognitive impairment were **16%** lower than those of participants with the lowest **25%** of scores.

For participants in the highest quartile for Vitamin C Equivalent Antioxidant Capacity, the odds for developing cognitive impairment were **25%** lower compared to those in the lowest quartile.

Editor's Note: When antioxidant nutrients were individually analyzed, greater daily intake of **vitamin C**, **vitamin E**, **carotenoids**, and **flavonoids** was associated with a reduced cognitive impairment risk.

* *J Gerontol A Biol Sci Med Sci.* 2021 Apr 7.

Higher Selenium Levels Could Improve Breast Cancer Survival

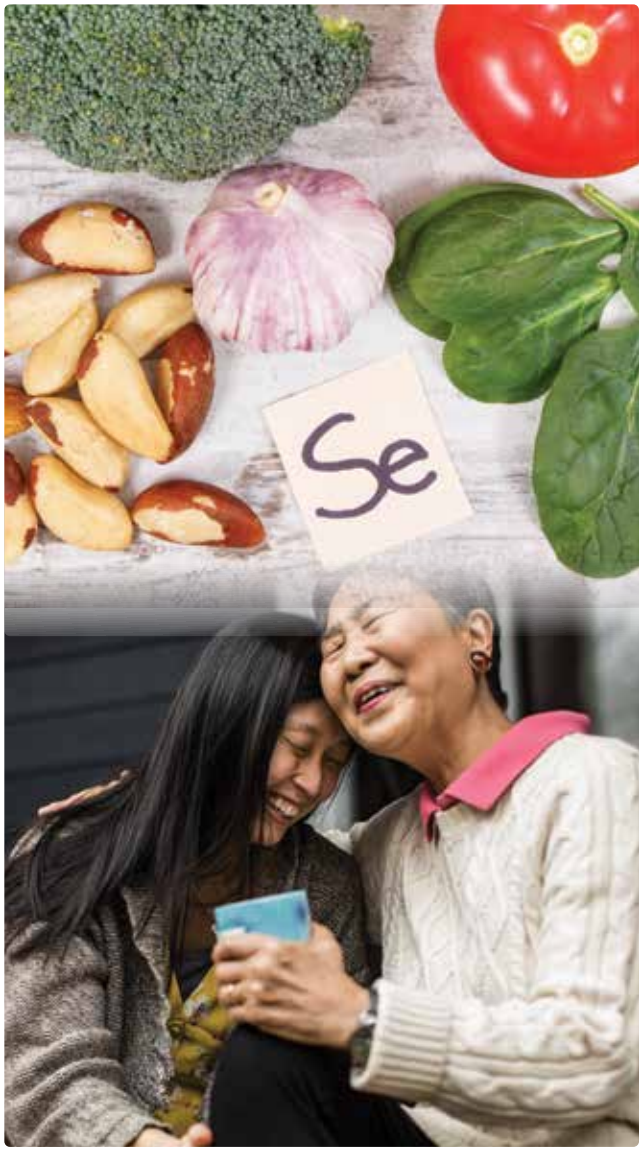
Higher **selenium** blood levels are associated with improved breast cancer **survival rates**.*

The 10-year survival rate was **65.1%** in women with the lowest **selenium** blood level.

The 10-year survival rate in women with the **highest selenium** blood levels was **86.7%**.

Editor's Note: A previous study found that higher selenium levels were linked to improved **five-year** survival rates in women with breast cancer. The current study included **10-year** survival rates in 538 women from the prior study.

* *Nutrients.* 2021 Mar; 13(3):953.



Calcium and Vitamin D Lower Fracture Risk in Vegan Women

A study published in the *American Journal of Clinical Nutrition* found that supplementation with **calcium** and **vitamin D** reduces fracture risk in vegan women, who have a *higher* risk of fracture than non-vegetarian women.*

Female vegans had a **53%** *higher* risk of experiencing a **hip fracture** than non-vegetarians.

Vegan women who supplemented with calcium and vitamin D *reduced* their hip fracture risk to that of non-vegetarians.

Editor's Note: Following a vegan diet may fail to provide adequate nutrients associated with greater bone mineral density, such as **calcium**, **vitamin D**, **zinc**, and **omega-3** fatty acids, thereby increasing fracture risk.

* *Am J Clin Nutr.* 2021 May 8.

Mediterranean Diet Protects Against Memory Loss and Dementia

A Mediterranean-style diet could protect against memory loss and dementia, a study published in the journal *Neurology* reported.*

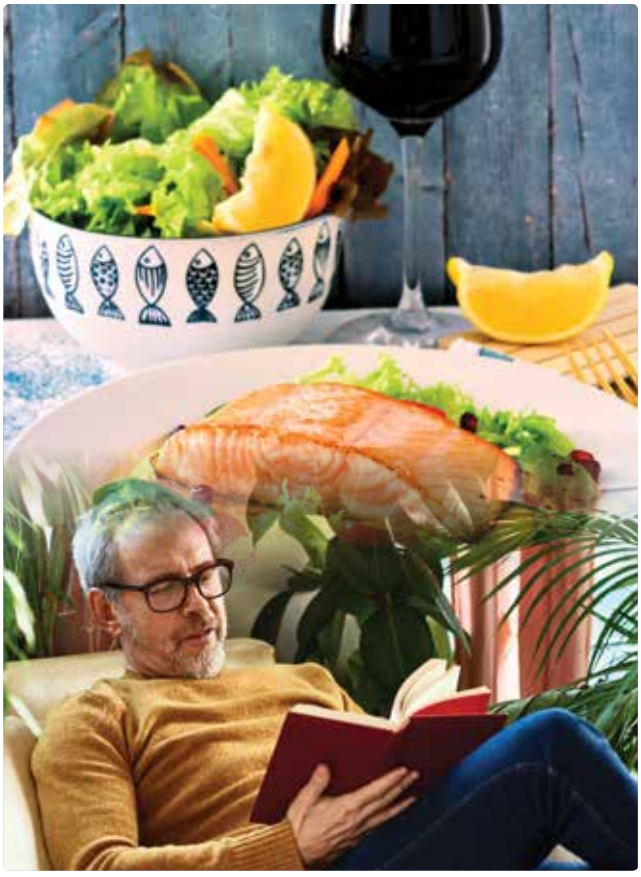
The 512 participants, with an average age of 70, completed food frequency questionnaires. They were then given MRI brain scans to determine brain volume, and neurological tests to examine their cognitive abilities and biomarkers for beta amyloid and tau proteins that characterize Alzheimer's disease.

People who ate an unhealthy diet had *higher* markers of amyloid beta and tau proteins in their cerebrospinal fluid, compared to those who followed a Mediterranean-style diet.

The unhealthy-diet eaters also performed *worse* on memory tests than those who ate healthy food.

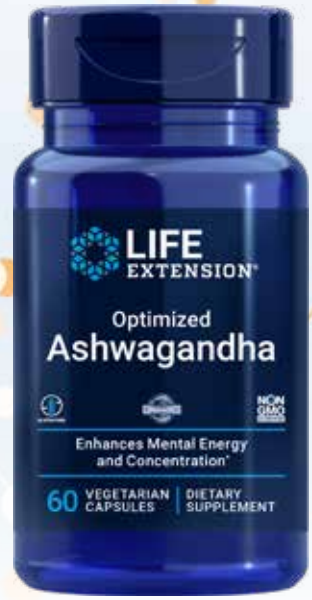
Editor's Note: Participants who did *not* eat a healthy, Mediterranean-style diet were also found to have a smaller hippocampus volume (the area of the brain responsible for thinking and memory) than those who did. The hippocampus is known to atrophy (shrink) in those with Alzheimer's disease.

* *Neurology.* 2021;96(24):e2920-e32.



REVITALIZE COMPONENTS OF YOUR AGING BRAIN!

OPTIMIZED ASHWAGANDHA



Ashwagandha has been shown to promote **cognitive function**, support a healthy **stress** response and help maintain more youthful **brain cell** structure.

Optimized Ashwagandha provides **standardized** leaf and root **extracts**.

Item #00888

60 vegetarian capsules

GLUTEN FREE

NON GMO LE CERTIFIED

Sensoril® is protected under US Patent Nos 6,153,198 and 6,713,092 and is a registered trademark of Natreon, Inc.

This product is available at fine health food stores everywhere.

POMEGRANATE
The Fruit of Life

Pomegranate Complete combines extracts from the **whole fruit**, **flower** and **seed oil** to support system-wide health.

Pomegranate plant compounds, rich in polyphenols, ellagic acid and urolithin A support whole body health.

Item #01953
30 softgels

This product is available at fine health food stores everywhere.

GLUTEN FREE
NON GMO
LE CERTIFIED

HEALTHY BONES = HEALTHY HEART

THREE WAYS TO GET VITAMIN K

SUPER K

SUPER K is our best-selling **vitamin K** formula for bone and heart health.

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

SUPER K Item #02334

90 softgels

SUPER K ELITE

Super K Elite provides 2 additional forms of vitamin K and even ***higher*** potencies of K1, MK-4, and MK-7.

Vitamin K1 (converts to K2 in some people)	**2,000 mcg**
Vitamin K2 (MK-4) (for bone & vascular health)	**1,500 mcg**
Vitamin K2 (MK-7) (long-acting protection)	**181 mcg**
Vitamin K2 (MK-9) (added cardiovascular support)	**43 mcg**
Vitamin K2 (MK-6) (added cardiovascular support)	**11 mcg**

SUPER K ELITE Item #02335

30 softgels

MEGA VITAMIN K2

Japanese physicians use ***high-dose*** **vitamin K2** for maintaining healthy bone density.

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

MEGA VITAMIN K2 Item #02417

30 capsules

GLUTEN FREE

NON GMO LE CERTIFIED

These products are available at fine health food stores everywhere.

PHAGES REGAIN MAINSTREAM RECOGNITION

BY MICHAEL DOWNEY

Bacteriophages were once recognized as powerful, life-saving weapons against **infection**.[1]

Called **phages** for short, they are tiny **DNA** or **RNA packages** wrapped in protein that attack ***specific bacteria***. They are harmless to humans and all other life forms.

Phage therapy was pushed out of the way when **antibiotics** were introduced.[1]

As the threat of **antibiotic-resistant infections** grows,[2] the medical establishment has begun to refocus on the potential of **phage therapy**.[3]

Mainstream media is paying attention too: The benefits and history of **phages** were recently explored in a feature in ***The New Yorker*** magazine.[4]

Scientists have found, in a laboratory study, that **phages** can help beneficial **probiotic bacteria** thrive and grow. This happens even in the presence of competitive bacteria that would otherwise suppress them.[5]

This may be related to the ability of specific **phages** to "seek and destroy." This means they can be selected to help protect against undesirable or disease-causing bacteria.[6]

A combination of **phages** with **probiotics** holds great promise to promote the health of the gut microbiome and to improve **intestinal function**.

What are Phages?

The word **bacteriophage** means "**bacteria eater**."

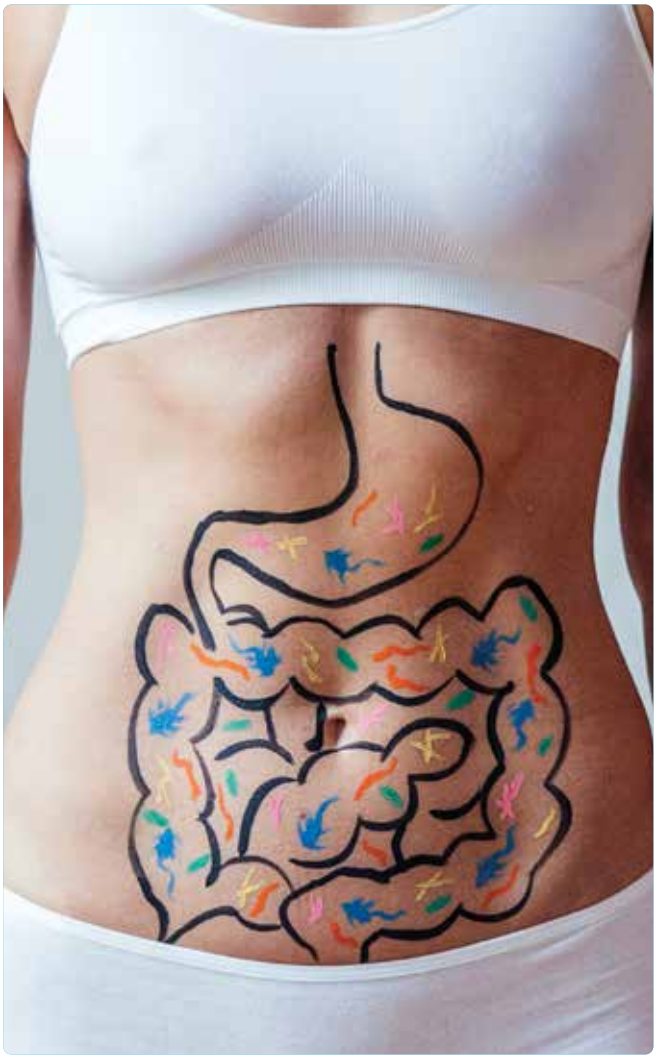
Phages are submicroscopic packages of DNA or RNA enclosed in a protein envelope that target and kill specific bacteria—and ***only*** these bacteria. Different phage strains target different bacteria. They pose no harm to *any* other life form, including humans.

Phages were first identified about a century ago and were used at the time to treat and prevent bacterial infections. But when **antibiotics** were discovered, focus shifted away from phages.[4]

Over time, **antibiotic-resistant bacteria**, also known as "super-bugs," have developed.

Today, about **700,000** people die every year from drug-resistant infections. That number is expected to reach ***10 million*** annually by 2050.[2]

This frightening reality has sparked renewed interest in **phage therapy**.



Phages Promote Microbiome Health

Scientists have identified a **blend of four phages** that may help decrease intestinal populations of undesirable bacteria while supporting probiotics.

Antibiotics employ a mass-killing technique, destroying both good *and* bad bacteria. But phages target ***only specific bacteria***.

This means the right **phages** can target undesired or **unhealthful bacteria** in the gut, helping to make room for the organisms we want to flourish. The end result is that the **gut microbiome** can be restored to a more healthy, balanced state.[6]

Promoting Growth of Beneficial Probiotics

E. coli (***Escherichia coli***) is a normal part of our gut microbiome. Usually it is harmless, though some strains can cause diarrhea, urinary tract infections, pneumonia, and other illnesses, and also crowd out beneficial organisms.[7]

To determine whether **the four-phage blend** could promote the growth of beneficial bacteria, researchers conducted a laboratory study.

E. coli was combined with various individual **probiotic bacteria** in test flasks that served as the control. In separate flasks, the **four-phage blend** was combined with *E. coli* and the probiotic bacteria.[5]

The growth of the beneficial bacteria was measured.

In the control flasks that contained *E. coli* but no phage blend, the probiotic bacteria grew very poorly. It appears that *E. coli* inhibited their growth—in other words, it outcompeted them.

In the flasks that also contained the **phage blend**, the probiotic bacteria **thrived**.

For instance, when the healthy probiotic bacteria ***Bifidobacterium longum*** was combined with ***E. coli***, there was little growth of the probiotic.

But in the flasks that contained the **phage** blend, beneficial ***B. longum*** colonies multiplied over **20 times** more than in the control flasks. The phages successfully promoted the growth of the beneficial probiotic.[5]

When this study was repeated using the probiotic ***Lactobacillus acidophilus***, similar results were obtained.

L. acidophilus growth was more than **10-fold *higher*** in the flasks containing **phage** plus probiotic and *E. coli*.

The scientists tested the **phage blend** again with another probiotic, this time ***Bifidobacterium bifidum***. The result in this case was **more than 30-fold higher growth**, in the presence of the phages.

Phages in Mice

Researchers next studied the effectiveness and safety of this **phage cocktail** in live animals.

Two groups of mice were given the beneficial probiotic ***B. longum***, along with a disease-causing ***E. coli*** strain. One group also received a **phage** blend specifically designed to target *E. coli*.[8]

After ***just 24 hours***, phage treatment decreased dangerous ***E. coli*** levels by about:[8]

- **10-fold** in the small intestine,
- **100-fold** in the large intestine, and
- **100-fold** in fecal matter.

WHAT YOU NEED TO KNOW

A Probiotic-Phage Blend for Digestive Health

- **Bacteriophages**, or **phages**, target *only* specific bacteria. They are harmless to all other life forms, including humans.
- As antibiotic-resistant bacteria have become a growing threat, scientists are focusing on using phages to treat deadly **infections**.
- Scientists have now identified **four phages** that promote the growth of beneficial bacteria.
- This probiotic blend can help improve a wide range of digestive issues, including **irritable bowel syndrome**, diarrhea, bloating, and gas.

At the same time, phage treatment increased beneficial ***B. longum*** levels by about:[8]

- **100-fold** in the small intestine,
- **100-fold** in the large intestine, and
- **40-fold** in fecal matter.

These results translated into clear benefits. The phage-treated mice had **healthy digestive function**, compared to mice infected with ***E. coli***, and the phage was not associated with any harmful side effects.[8]

The mice given only *E. coli* and *B. longum*—without added **phages**—became constipated, and their intestines showed swelling, redness, and leaks.[8]

Given these results, scientists have now added this same **bacteriophage** blend to **probiotics** for humans, to boost their effectiveness.

Super-Charging Probiotics

Two qualities to look for when selecting the **type** of **probiotic bacteria** is to ensure:

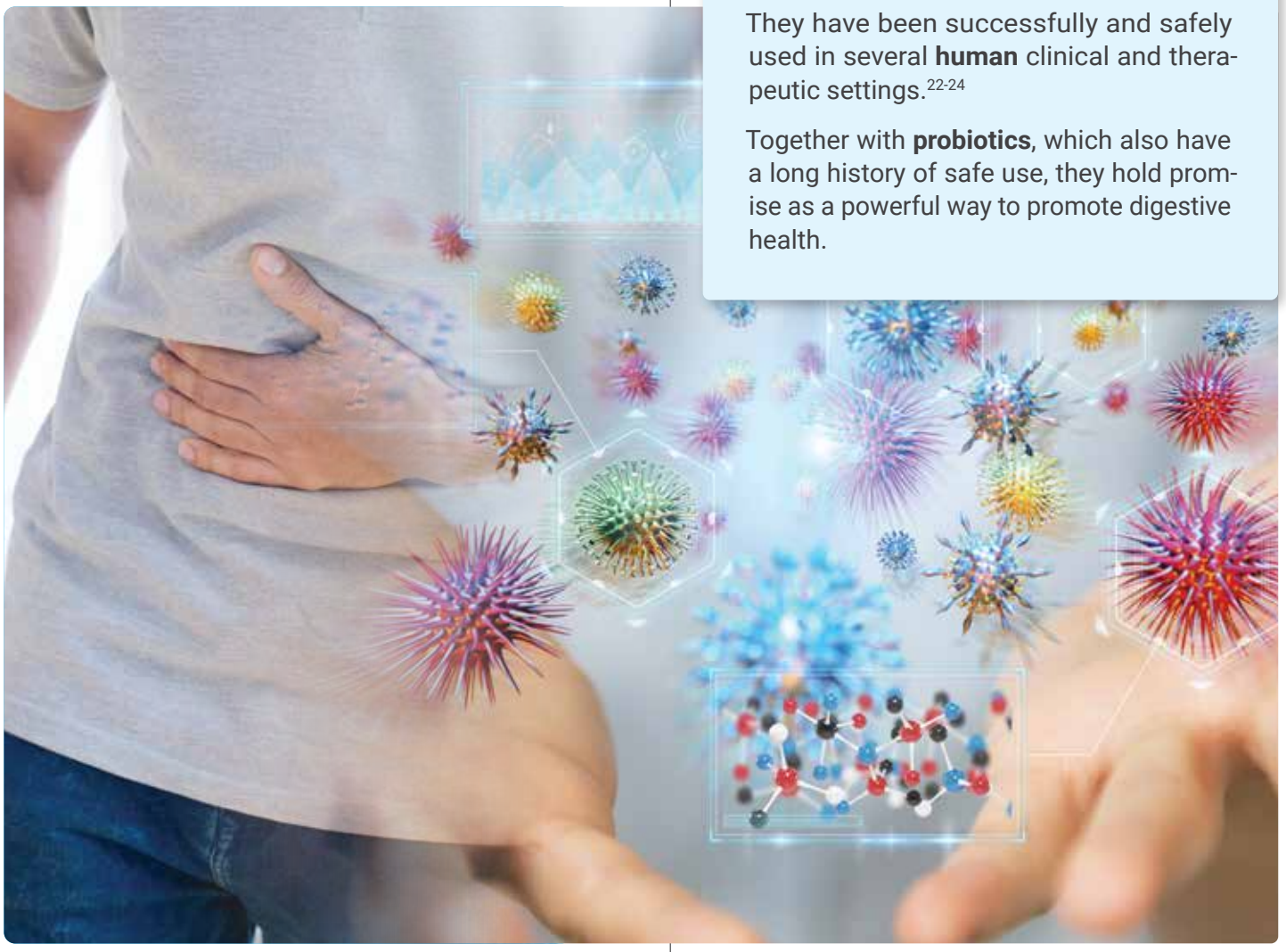
1. They have been studied in different combinations and shown to help improve a variety of **digestive symptoms**,[9-19] and
2. Some of the **probiotic** species multiplied to a much greater extent when cultured along with a specific **bacteriophage blend**.[5]

Deadly for Bacteria, Safe for You

Bacteriophages are found almost everywhere—from soil, hot springs, and the ocean depths, to the animal and human body.[21]

They have been successfully and safely used in several **human** clinical and therapeutic settings.[22-24]

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



Specific **probiotics** have demonstrated the following benefits:

- ***B. longum SP54***, ***L. paracasei IMC502***, and ***L. rhamnosus IMC501*** provide antimicrobial effects against **Candida** (a fungus that can cause problems when it overgrows), ***H. pylori*** (a bacteria that can cause ulcers), and ***E. coli***.[16,18,20]
- ***B. lactis BLC1*** and ***L. acidophilus LA1*** relieve symptoms of **ulcerative colitis** (a disease that causes inflammation and ulcers in the colon)[12] and ease **lactose intolerance**.[19]
- ***B. breve Bbr8*** and ***L. plantarum 14D*** reduce symptoms of **celiac disease**, which can include diarrhea, bloating, and gas.[9,11]

In addition, these **probiotic strains** have been shown to improve **irritable bowel syndrome**.[9,10,12-15]

Scientists have combined seven **probiotic strains** with a **four-phage blend**.

This combination holds promise for those with gastrointestinal issues and anyone searching for a way to improve digestive health.

Summary

Bacteriophages, or **phages**, destroy only *specific bacteria*. They are harmless to humans and all other life forms.

Phages were once used as a powerful weapon against deadly infections, but they were pushed aside when **antibiotics** were discovered.

As bacteria have developed a resistance to antibiotics, scientists have begun focusing on **phage** therapies again.

A **four-phage blend** has been shown to promote the growth of *beneficial* probiotic bacteria.

By combining these **phages** with seven specific **probiotics**, scientists have developed a potent way to target and improve an array of digestive issues. •

References

1. Bakhshinejad B, Ghiasvand S. Bacteriophages in the human gut: Our fellow travelers throughout life and potential biomarkers of heath or disease. *Virus Res.* 2017 Aug 15;240:47-55.
2. Available at: https://www.who.int/news/item/29-04-2019-new-report-calls-for-urgent-action-to-avert-antimicrobial-resistance-crisis. Accessed June 7, 2021.
3. Keen EC. A century of phage research: bacteriophages and the shaping of modern biology. *Bioessays.* 2015 Jan;37(1):6-9.
4. Available at: https://www.newyorker.com/magazine/2020/12/21/when-a-virus-is-the-cure. Accessed June 8, 2021.
5. Supplier Internal Study. A Probiotic-Enhancing Prebiotic. Data on File.
6. Mimee M, Citorik RJ, Lu TK. Microbiome therapeutics - Advances and challenges. *Adv Drug Deliv Rev.* 2016 Oct 1;105(Pt A):44-54.
7. Available at: https://www.cdc.gov/ecoli/general/index.html. Accessed June 4, 2021.
8. Supplier Internal Study. Bacteriophage Cocktail Mice Trials. Data on File.
9. Francavilla R, Piccolo M, Francavilla A, et al. Clinical and Microbiological Effect of a Multispecies Probiotic Supplementation in Celiac Patients With Persistent IBS-type Symptoms: A Randomized, Double-Blind, Placebo-controlled, Multicenter Trial. *J Clin Gastroenterol.* 2019 Mar;53(3):e117-e25.
10. Verdenelli MC, Silvi S, Cecchini C, et al. Influence of a combination of two potential probiotic strains, Lactobacillus rhamnosus IMC 501(R) and Lactobacillus paracasei IMC 502(R) on bowel habits of healthy adults. *Lett Appl Microbiol.* 2011 Jun;52(6):596-602.
11. Cristofori F, Indrio F, Miniello VL, et al. Probiotics in Celiac Disease. *Nutrients*. 2018 Nov 23;10(12).

12. Alm L, Ryd-Kjellen E, Setterberg G, et al. Effect of a new fermented milk product 'CULTURA'on constipation in geriatric patients. Paper presented at: 1st Lactic Acid Bacteria Computer Conference Proceedings. Horizon Scientific Press, Norfolk, England1993.
13. Black F, Andersen P, Ørskov J, et al. Prophylactic efficacy of lactobacilli on traveler's diarrhea. *Travel Medicine:* Springer; 1989:333-5.
14. Silvi S, Verdenelli MC, Cecchini C, et al. Probiotic-enriched foods and dietary supplement containing SYNBIO positively affects bowel habits in healthy adults: an assessment using standard statistical analysis and Support Vector Machines. *Int J Food Sci Nutr.* 2014 Dec;65(8):994-1002.
15. Yaeshima T, Takahashi S, Matsumoto N, et al. Effect of Yogurt Containing Bifidobacterium longum BB536 on the Intestinal Environment, Fecal Characteristics and Defecation Frequency. *Bioscience & Microflora*. 1997;16(2):73-7.
16. Coman MM, Verdenelli MC, Cecchini C, et al. In vitro evaluation of antimicrobial activity of Lactobacillus rhamnosus IMC 501((R)), Lactobacillus paracasei IMC 502((R)) and SYNBIO((R)) against pathogens. *J Appl Microbiol*. 2014 Aug;117(2):518-27.
17. Laake KO, Bjorneklett A, Aamodt G, et al. Outcome of four weeks' intervention with probiotics on symptoms and endoscopic appearance after surgical reconstruction with a J-configurated ileal-pouch-anal-anastomosis in ulcerative colitis. *Scand J Gastroenterol*. 2005 Jan;40(1):43-51.
18. Namba K, Yaeshima T, Ishibashi N, et al. Inhibitory Effects ofBifidobacterium longumon EnterohemorrhagicEscherichia coliO157: H7. 2003;22(3):85-91.
19. Virta PJER, Pharmacia, Finland. The Effect of a Preparation Containing Freeze-Dried Lactic Acid Bacteria [L. acidophilus LA-5 (LA-1) and Bifidobacterium TB-12] on Lactose Intolerance. 1993.
20. Verdenelli MC, Cecchini C, Coman MM, et al. Impact of Probiotic SYNBIO((R)) Administered by Vaginal Suppositories in Promoting Vaginal Health of Apparently Healthy Women. *Curr Microbiol.* 2016 Oct;73(4):483-90.
21. Dabrowska K, Switala-Jelen K, Opolski A, et al. Bacteriophage penetration in vertebrates. *J Appl Microbiol.* 2005;98(1):7-13.
22. Sarker SA, McCallin S, Barretto C, et al. Oral T4-like phage cocktail application to healthy adult volunteers from Bangladesh. *Virology*. 2012 Dec 20;434(2):222-32.
23. Bruttin A, Brussow H. Human volunteers receiving Escherichia coli phage T4 orally: a safety test of phage therapy. *Antimicrob Agents Chemother*. 2005 Jul;49(7):2874-8.
24. McCallin S, Alam Sarker S, Barretto C, et al. Safety analysis of a Russian phage cocktail: from metagenomic analysis to oral application in healthy human subjects. *Virology.* 2013 Sep 1;443(2):187-96.

B SMART

Body & Brain

BIOACTIVE FORMS OF VITAMIN B12

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
- Promotes red blood cell production
- Helps maintain already-healthy homocysteine levels

Dissolve in the mouth or chew one vegetarian **lozenge** daily.

Item #02419

60 vegetarian lozenges

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

Support Healthy Immune Function with

WHEY Protein

(Whey Concentrate) (Whey Isolate) (Whey + Creatine + Glutamine)

Whey protein, packed with vital amino acids, promotes **glutathione** synthesis.

Glutathione plays an important role in supporting healthy **immune** function in the body.[1-3]

Whey fractions help modulate a full range of healthy bodily functions.

References

1. *Int J Gen Med.* 2011 Jan 25;4:105-13.
2. *Br J Nutr.* 2000 Nov;84 Suppl 1:S81-9.
3. *J Dairy Sci.* 2000 Jun;83(6):1187-95.

These products are available at fine health food stores everywhere.

GLUTEN FREE NON GMO LE CERTIFIED

Choose the Best Whey for You!

WHEY PROTEIN CONCENTRATE
(chocolate or vanilla flavor)
Pure whey with the water removed.
Contains 80% easy-to-digest protein.
Item #02260 Vanilla • Item #02261 Chocolate

WHEY PROTEIN ISOLATE (chocolate or vanilla flavor)
Filtered to reduce carbohydrates, lactose and fat.
Contains 98% protein with some lactose.
Item #02242 Vanilla • Item #02243 Chocolate

ADVANCED WHEY PROTEIN ISOLATE
A premium isolate for greater strength and exercise performance. **Item #02246 Vanilla**

Contains milk. Use these products as a food supplement only. Do not use for weight reduction.

In with the Good

Out with the Bad

FLORASSIST® GI
For Healthy Digestion

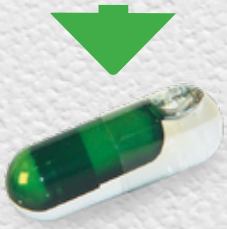
Phages target bad intestinal bacteria, allowing beneficial strains to flourish.

FLORASSIST® GI provides a 7-strain blend of **probiotics** in a **dual encapsulation** formula to deliver beneficial bacteria and **phages** where you need them the most.

GLUTEN FREE

NON GMO LE CERTIFIED

Dual-Encapsulation Delivery



Item #02125

30 liquid vegetarian capsules

Note: Color of inner capsule may vary but does not affect ingredients.

This product is available at fine health food stores everywhere.

LITHIUM Extends Lifespan and Slows Brain Aging

BY MICHAEL DOWNEY

During the past two centuries, people made pilgrimages to springs that were naturally high in the mineral **lithium**.

One site, **Lithia Springs** in Georgia, was visited by Mark Twain, at least *four* U.S. presidents, and other prominent figures, all because of the famous **lithium water**.

The more that scientists study **lithium**, the more persuasive the evidence has become for its unique effects.

Scientists have found that lithium may prevent **cognitive decline**.[1,2] Preclinical studies have shown it activates pathways that may slow the **aging process**.[3,4]

In one animal study, high doses of **lithium** increased median **lifespan** by **46%**.[5]

Two studies have found that individuals living in areas with even modest levels of lithium in drinking water tend to ***live longer***.[6,7]

As little as **300** to **1,000 mcg** of **lithium** daily may provide these benefits.

What is Lithium?

Lithium is a naturally occurring mineral found in rocks and subsoil in some geographical areas. Some natural water sources contain small amounts of this element.

By the 19th century, many people had come to believe that there were health and **longevity** benefits to drinking water that contained lithium. It also became linked to improved **mood**.

Modern science has confirmed these beliefs.

For instance, two studies found that people living in areas with even **low levels** of lithium in the drinking water tend to ***live longer***.[6,7]

Lithium and the 'Age-Accelerating Enzyme'

One key to lithium's benefits appears to be its ability to *inhibit* a cellular *enzyme* called **glycogen synthase kinase-3** (**GSK-3**).[3,4,8]

GSK-3 controls several important functions within cells. But ***overactivity*** of GSK-3 can be harmful.

Increased GSK-3 activity correlates with **rapid aging** of many tissues and the entire body.[9,10] Its impact is so dramatic that GSK-3 can be thought of as an **age-accelerating** *enzyme*.

Overactivity of GSK-3 is linked to **chronic diseases**, including Alzheimer's, type II diabetes, some cancers, and mood disorders.[4,11-14]

Even in low doses, lithium ***reduces*** GSK-3 overactivity.[3,4,8]

Studies suggest that this **GSK-3 inhibition** is largely responsible for lithium's ability to protect brain function and promote healthy longevity.[3,8]

Boosting Longevity

Scientists have noted that people taking **high-dose lithium** for medical reasons generally have ***lower mortality rates***, including lower rates of death due to **cardiovascular disease**.[15,16]

Controlled experiments have been conducted to rigorously explore possible life-extending effects of lithium.

These studies showed that **low-dose lithium** led to a modest **increase in lifespan** in roundworms, known as *C. elegans*.[7]

Higher doses of lithium led to longer lifespans in both roundworms and fruit flies.[3,5,7] In one of these studies, median survival was boosted by **46%**.[9]

Evidence from these and other studies suggested that, in addition to inhibiting GSK-3, lithium exerted **pro-longevity** effects in three ways:[5,17,18]

- Lithium may help maintain longer **telomeres**, protective structures related to cellular health,
- Lithium regulates **genes** related to healthy **DNA structure**, and
- Lithium may protect against **cell senescence**. Senescent cells are contributors to age-related disease and accelerated aging.

Together, these mechanisms may help slow the aging process and protect against chronic disease.

Protecting the Brain

Very *high* doses of lithium have long been used to treat the psychiatric condition **bipolar disorder**.

Now, clinical studies suggest that much *lower* doses of lithium provide **neuroprotective** benefits.

Scientists are finding that lithium may help prevent or improve mood disorders, dementia, and Alzheimer's disease.

One study found that long-term lithium exposure from drinking water may be associated with a *lower* risk of being diagnosed with **dementia**.[19]

Similar benefits have been demonstrated with **Alzheimer's disease**.

One epidemiological study in Texas revealed that rates of death from Alzheimer's were *higher* in areas with *low* levels of lithium in the water.[20]

In one clinical study, a micro-dose of just **300 mcg** of lithium daily was found to ***significantly*** decrease ***cognitive decline*** in Alzheimer's patients, compared to a placebo.[21]

Mechanisms of Neuroprotection

Lithium appears to protect the **brain** in a number of different ways.

In preclinical research, scientists found that it not only reduces the elevated **GSK-3 activity** associated with **Alzheimer's**, but *also* reduces the buildup of **beta-amyloid**. This is the abnormal protein that accumulates and forms plaques in the brains of Alzheimer's patients.[22]

Scientists have also documented that lithium:[8]

- Increases the activity of multiple beneficial **neurotransmitters** in the brain,
- Increases **brain-derived neurotrophic factor**, an important signaling molecule that protects brain cells and augments their function, and
- Helps balance **circadian rhythm** and may help with **adrenal hormone** function.

In clinical studies, lithium treatment has been linked to additional signs of **neuroprotection**, including:[23]

- Thickening of the **cerebral cortex**, the brain's outer layer,
- Increased density of **gray matter**, which contains most of the brain's nerve cell bodies, and
- Enlargement of the **hippocampus**, the brain's memory center.

All of these activities together may slow brain aging and protect against cognitive decline.

WHAT YOU NEED TO KNOW

Lithium's Brain *and* Body Benefits

- Studies have found that people living in areas with the mineral **lithium** in the drinking water tend to live longer.
- Patients taking lithium for medical reasons also have **lower mortality rates**, and lithium treatment extends **lifespan** in animal studies.
- Lithium in drinking water may also be associated with a *lower* risk of being diagnosed with **dementia**.
- In a clinical study, **300 mcg** of lithium daily ***significantly decreased cognitive decline*** in patients with Alzheimer's disease.
- Lithium appears to work largely by *inhibiting* overactivity of the "age-accelerating enzyme" **GSK-3**, which has been tied to rapid aging, cognitive decline, and risk for chronic diseases.
- **Low-dose lithium** may reduce risk for age-related disorders, protect brain function, and extend healthy lifespan.

Summary

The mineral **lithium** is demonstrating broad-spectrum health benefits.

Lithium works, in part, by inhibiting the overactivity of the "age-accelerating enzyme" **GSK-3** and protecting DNA.

Lithium intake is associated with **longer lifespan** in humans and a median **46%** increase in longevity in roundworms.

In a clinical study, it decreased cognitive decline in patients with **Alzheimer's disease**.

Research shows that low lithium doses—only **300 mcg** to about **1,000 mcg** daily—may benefit mental and physical health and increase longevity. •

References

1. Matsunaga S, Kishi T, Annas P, et al. Lithium as a Treatment for Alzheimer's Disease: A Systematic Review and Meta-Analysis. *J Alzheimers Dis.* 2015;48(2):403-10.
2. Forlenza OV, Radanovic M, Talib LL, et al. Clinical and biological effects of long-term lithium treatment in older adults with amnestic mild cognitive impairment: randomised clinical trial. *Br J Psychiatry.* 2019 Nov;215(5):668-74.
3. Castillo-Quan JI, Li L, Kinghorn KJ, et al. Lithium Promotes Longevity through GSK3/NRF2-Dependent Hormesis. *Cell Rep.* 2016 Apr 19;15(3):638-50.
4. Saraswati AP, Ali Hussaini SM, Krishna NH, et al. Glycogen synthase kinase-3 and its inhibitors: Potential target for various therapeutic conditions. *Eur J Med Chem.* 2018 Jan 20;144:843-58.
5. McColl G, Killilea DW, Hubbard AE, et al. Pharmacogenetic analysis of lithium-induced delayed aging in Caenorhabditis elegans. *J Biol Chem.* 2008 Jan 4;283(1):350-7.
6. Fajardo VA, LeBlanc PJ, Fajardo VA. Trace lithium in Texas tap water is negatively associated with all-cause mortality and premature death. *Appl Physiol Nutr Metab.* 2018 Apr;43(4):412-4.
7. Zarse K, Terao T, Tian J, et al. Low-dose lithium uptake promotes longevity in humans and metazoans. *Eur J Nutr.* 2011 Aug;50(5):387-9.
8. Won E, Kim YK. An Oldie but Goodie: Lithium in the Treatment of Bipolar Disorder through Neuroprotective and Neurotrophic Mechanisms. *Int J Mol Sci.* 2017 Dec 11;18(12).
9. Lei P, Ayton S, Bush AI, et al. GSK-3 in Neurodegenerative Diseases. *Int J Alzheimers Dis.* 2011;2011:189246.
10. Zhou J, Force T. Focusing the spotlight on GSK-3 in aging. *Aging (Albany NY).* 2013 Jun;5(6):388-9.
11. Henriksen BS, Curtis ME, Fillmore N, et al. The effects of chronic AMPK activation on hepatic triglyceride accumulation and glycerol 3-phosphate acyltransferase activity with high fat feeding. *Diabetol Metab Syndr.* 2013;5:29.
12. Hooper C, Killick R, Lovestone S. The GSK3 hypothesis of Alzheimer's disease. *J Neurochem.* 2008 Mar;104(6):1433-9.
13. Jope RS, Roh MS. Glycogen synthase kinase-3 (GSK3) in psychiatric diseases and therapeutic interventions. *Curr Drug Targets.* 2006 Nov;7(11):1421-34.
14. Zhang Y, Huang NQ, Yan F, et al. Diabetes mellitus and Alzheimer's disease: GSK-3beta as a potential link. *Behav Brain Res.* 2018 Feb 26;339:57-65.
15. Ahrens B, Grof P, Moller HJ, et al. Extended survival of patients on long-term lithium treatment. *Can J Psychiatry.* 1995 Jun;40(5):241-6.
16. Cipriani A, Pretty H, Hawton K, et al. Lithium in the prevention of suicidal behavior and all-cause mortality in patients with mood disorders: a systematic review of randomized trials. *Am J Psychiatry.* 2005 Oct;162(10):1805-19.
17. Squassina A, Pisanu C, Congiu D, et al. Leukocyte telomere length positively correlates with duration of lithium treatment in bipolar disorder patients. *Eur Neuropsychopharmacol.* 2016 Jul;26(7):1241-7.
18. Zmijewski JW, Jope RS. Nuclear accumulation of glycogen synthase kinase-3 during replicative senescence of human fibroblasts. *Aging Cell.* 2004 Oct;3(5):309-17.
19. Kessing LV, Gerds TA, Knudsen NN, et al. Association of Lithium in Drinking Water With the Incidence of Dementia. *JAMA Psychiatry.* 2017 Oct 1;74(10):1005-10.
20. Fajardo VA, Fajardo VA, LeBlanc PJ, et al. Examining the Relationship between Trace Lithium in Drinking Water and the Rising Rates of Age-Adjusted Alzheimer's Disease Mortality in Texas. *J Alzheimers Dis.* 2018;61(1):425-34.
21. Nunes MA, Viel TA, Buck HS. Microdose lithium treatment stabilized cognitive impairment in patients with Alzheimer's disease. *Curr Alzheimer Res.* 2013 Jan;10(1):104-7.
22. Sofola-Adesakin O, Castillo-Quan JI, Rallis C, et al. Lithium suppresses Abeta pathology by inhibiting translation in an adult Drosophila model of Alzheimer's disease. *Front Aging Neurosci.* 2014;6:190.
23. Forlenza OV, de Paula VJ, Machado-Vieira R, et al. Does lithium prevent Alzheimer's disease? *Drugs Aging.* 2012 May 1;29(5):335-42.

Feel like a Kid Again

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

Nicotimamide riboside (300 mg), *trans*-resveratrol and other cell energizing nutrients in one capsule.

Item #02348 • 30 veg. caps.

NAD+ Cell Regenerator™

300 mg of nicotimamide riboside per capsule.

Item #02344 • 30 veg. caps.

GLUTEN FREE

NON GMO LE CERTIFIED

These products are available at fine health food stores everywhere.

Munch,

Crunch, Digest Your Lunch

(Or breakfast, or dinner...)

Uncomfortable after eating?

Digestive enzymes are specialized proteins that help you break down the foods you eat.

Enhanced Super Digestive Enzymes combines 10 vegetarian-friendly enzymes to help you break down hard-to-digest foods and encourage a healthy gastrointestinal balance...so you can feel good after you eat!

Item #02021

60 vegetarian capsules

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

A Bodyguard *for Your* Brain

People tend to live longer in areas where lithium is abundant in the drinking water.*

Lithium is a low-cost mineral that functions in several ways to support cognition and overall brain health.

Protect healthy cognition with lithium—it's like a bodyguard for your brain!

**European Journal of Nutrition.* 2011;50(5):387-389.

GLUTEN FREE

NON GMO LE CERTIFIED

LITHIUM

(**1000 mcg** of **lithium** per tiny capsule)
Item #02403

100 vegetarian capsules

Each bottle lasts 100 days.

This product is available at fine health food stores everywhere.

PLANT PIGMENTS PROTECT AGAINST **VISION LOSS**

BY MICHAEL DOWNEY

A major cause of **blindness** in the United States is **macular degeneration**.[1]

Up to **11 million** Americans are afflicted with it.[2]

Scientists have identified **plant pigments** that accumulate in the eyes and protect macular density.[3-5]

Lutein, **zeaxanthin**, ***meso*-zeaxanthin** and **astaxanthin** can help protect against age-related macular degeneration.

People with the *highest* intake of **lutein** and **zeaxanthin** have a ***41% lower risk*** of advanced macular degeneration.[6]

For people *already* afflicted, extracts of the spice **saffron** have been shown to improve **visual function**.[7]

One study in patients with early macular degeneration showed that **80%** of those taking saffron daily for three months improved **visual acuity** on the Snellen eye chart (by one line) compared to baseline.[8]

An improvement by one line on the Snellen chart means someone whose visual acuity at a distance was **20/40** would be able to see with **20/30** vision after just **three months** of daily **saffron** use.

Several other compounds have been shown to help *prevent* and even partially *restore* the **vision loss** that occurs with age-related macular degeneration.

A Leading Cause of Blindness

Age-related macular degeneration is the leading cause of severe vision loss and **blindness** in people over age 60.[9]

Risk factors for age-related macular degeneration include:[10]

- Age
- Family history
- Genetics
- Tobacco use
- High blood pressure
- Cardiovascular disease
- Obesity
- Sun exposure
- Diet low in dark green leafy vegetables and omega-3 fatty acids

The *progressive* damage that occurs to the **macula** contributes to the characteristic gradual *loss* of **central vision**. Patients often complain that central vision becomes washed out, with a loss of detail. Straight lines may also appear wavy.[10]

Lutein and Zeaxanthin

Lutein and **zeaxanthin** are dietary carotenoids found in dark green leafy vegetables and colorful fruits.[11]

Within the body, they concentrate in several parts of the eye, including the **macula**.[12-14]

There, they absorb **blue** and **ultraviolet** light, preventing retina damage. They also quench free radicals, inhibiting their destructive impact on the cells of the retina.[13-16]

In one study of adults with age-related macular degeneration, taking **10 mg** of **lutein** daily for **one year** increased macular pigment **density** by almost **40%**, compared to baseline.[17]

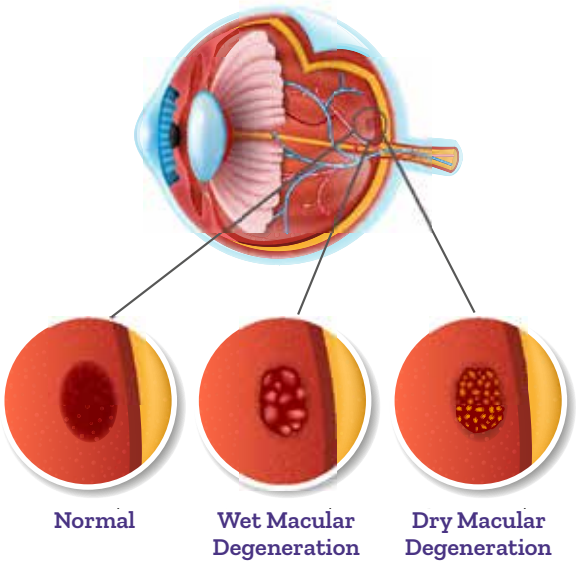
Increased **macular pigment ocular density** means increased protection against ultraviolet and blue light.

Scientists demonstrated that 48 weeks of taking daily **lutein** alone *or* **lutein** combined with **zeaxanthin** produced significant increases in ***electroretinogram signals***.[18] This is a measure of the power of light-sensitive cells to produce electrical impulses after stimulation by light.[19]

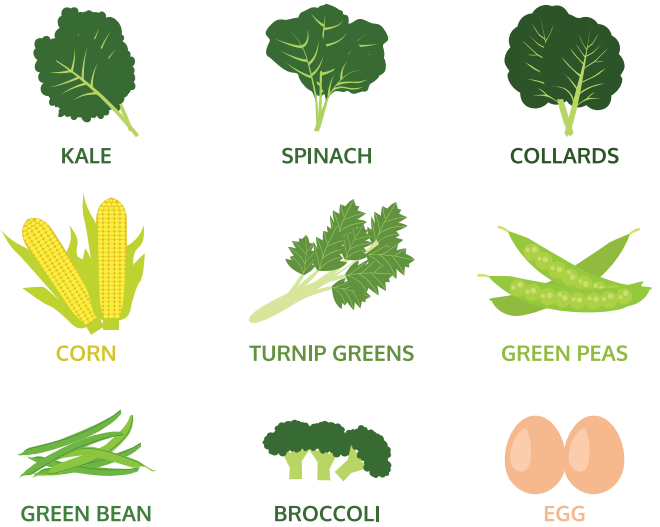
In a series of large clinical studies, researchers documented that oral intake of lutein and/or zeaxanthin can:[6,17,18,20-22]

- Improve **retinal function**,
- Increase the ability to see contrasting **colors** and **shapes**, and
- Improve **visual acuity** (the ability to see sharply at a distance).

Macular Degeneration



Lutein- and Zeaxanthin-rich Foods



One study of over **102,000** people aged 50 and older took more than ***20 years*** to complete.

It found that those with the *highest* intake of **lutein** and **zeaxanthin** had a remarkable **41% lower** risk of advanced macular degeneration.[6]

Meso-Zeaxanthin

***Meso*-zeaxanthin** is a yellow carotenoid derived from lutein. It is known to be produced in the eye itself, and a small amount may occur in certain foods.[23]

Individuals with **macular degeneration** have **30%** less ***meso*-zeaxanthin** in their macula than those with good eye health.[24]

One reason for this deficiency of ***meso*-zeaxanthin** is lack of ingested lutein. Another explanation for the missing ***meso*-zeaxanthin** observed in macular degeneration is inability to adequately convert lutein to *meso*-zeaxanthin.

Meso-zeaxanthin, when taken **orally**, **i**ncreases protective **macular pigment** levels.[25]

Astaxanthin

Astaxanthin is a reddish carotenoid found in marine algae and some seafood.[26,27]

In preclinical studies, it protects the cells of the retina from being damaged by physical and oxidative **stress**.[26-28]

For example, **astaxanthin** may protect eye cells from UV-induced, free-radical damage by *suppressing* activation of an inflammatory protein, **nuclear factor-kappa B** (**NF-kB**).[29]

In experimental studies, astaxanthin prevented the vision-damaging effects of **wet macular degeneration** that occurs when blood vessels leak fluid into the retina. One rodent study showed it prevented cell damage related to increased pressure in the eye, which is the underlying problem in **glaucoma**.[30]

Astaxanthin's eye-protecting ability may be especially beneficial for people with **diabetes**.

Diabetic retinopathy occurs when high levels of blood sugar damage the retina over time, leading to vision problems. Among those who have had diabetes for over a decade, **80%** suffer from this condition.[26]

In animal studies, astaxanthin targets the retina and *prevents* the early **nerve-cell death** that is caused by excess blood sugar.[26]

Research has found that **6 mg** of astaxanthin daily helped promote visual sharpness and eye health.[31]

WHAT YOU NEED TO KNOW

Powerful Protection for the Eyes

- Age-related **vision loss** is extremely common and may lead to eventual blindness.
- **Lutein**, **zeaxanthin**, ***meso*-zeaxanthin**, **astaxanthin**, **saffron**, and **alpha-carotene** have been identified as key nutrients that can protect the eyes and slow the progression of age-related macular degeneration.
- **Cyanidin-3-glucoside**, found in certain dark berries, enhances night vision.

Saffron

Clinical studies demonstrate that **saffron**, a spice derived from the crocus flower, improves various **visual functions**.[32]

Saffron has been studied for an array of neurodegenerative eye diseases, including:[33,34]

- Age-related macular degeneration, and
- Diabetic retinopathy.

Saffron may provide these benefits thanks to its anti-inflammatory, antioxidant, and neuroprotective properties, along with its ability to help prevent cell death.[35]

In one clinical study, **20 mg** of **saffron** enhanced **visual function** in patients with *mild to moderate* age-related macular degeneration, including those already taking lutein and zeaxanthin.

Compared to those taking a placebo, participants who took **saffron** alone improved on a standard vision-measuring eye chart by **.69** letters. Those already taking **lutein** or **zeaxanthin** improved by **.73 letters**.[7]

In another study, **20 mg** of saffron daily improved the **light-sensing** abilities of retinal cells for patients with *early* age-related macular degeneration. After three months, these subjects were able to read **one entire additional line** on an eye chart, while those taking a **placebo** did not improve.[8]

This means that someone whose **visual acuity** at a distance was **20/40** would be able to see with **20/30** vision after just three months of saffron use.

To test longer-term benefits, scientists gave **20 mg** of saffron daily to patients with *early* macular degeneration for an average of **14 months**. Retinal sensitivity was improved for the entire period, and average **visual acuity** improved by an astounding ***two lines*** on an eye chart.[36]

This showed that *longer* **saffron** use produces *greater* improvement.[36]

Alpha-Carotene

Alpha-carotene, a carotenoid and vitamin A precursor found in pumpkins and carrots, protects retinal cells from light-induced **oxidative damage**.

One study analyzed 63,443 women and 38,603 men, aged 50 and older. It found that those with the *highest* dietary intake of **alpha-carotene** had a **31% reduced risk** of developing **advanced age-related macular degeneration**, compared to those with the lowest consumption.[6]

This yellow-orange carotenoid has even been shown to provide protection for smokers.

In one study of 1,414 men aged 65 and over, smokers with the highest **alpha-carotene** intake were found to have a significantly reduced risk of developing age-related **macular degeneration**.[37]

Saffron

Cyanidin-3-Glucoside

Cyanidin-3-glucoside (C3G) is a flavonoid found in many dark-colored berries.[38,39]

Recent research on human cells suggests that **cyanidin-3-glucoside** may protect epithelial (surface) cells in the **cornea** (the eye's protective outer layer) against damaging effects of **bacterial activity** and **inflammation**.[40]

C3G may also reduce **oxidative damage** from light and free radicals in retinal pigment epithelium cells.[41]

While these investigations are preliminary, **cyanidin-3-glucoside** may offer support to macular degeneration patients.

Many of these afflicted individuals experience difficulties when performing activities at night and under low light, such as driving or reading at night.[42]

The retina's rod cells are the eye's most sensitive cells, allowing us to see in very dim light. *Loss* of rod cells is associated with **night blindness** or **reduced vision** in low light.[43]

Cyanidin-3-glucoside has been shown to enhance the quality and function of **rhodopsin**, a light-sensitive protein found in the rod cells of the retina. It also boosts the ability of rhodopsin to **regenerate**.[39,44-46]

One study of healthy volunteers showed that a berry extract containing **cyanidin-3-glucoside** improved **night vision**, allowing aging individuals to see better in darkness. This improvement was noticeable *after just 30 minutes*.[47]

Taken in combination, C3G and other eye-protecting nutrients may provide the most complete range of benefits for **preventing** age-related **vision loss**.

Summary

Loss of **visual acuity** and **night blindness** are major threats to aging adults.

Extensive evidence demonstrates that the carotenoids **lutein**, **zeaxanthin**, ***meso*-zeaxanthin**, and **astaxanthin** protect the eye and help prevent vision loss as a result of **macular degeneration**, and possibly other conditions as well.

In addition, the spice **saffron** protects against *early* macular degeneration, while **alpha-carotene** helps protect against *advanced* macular degeneration.

The flavonoid **cyanidin-3-glucoside** can enhance **night vision** in as little as **30 minutes**.

In combination, these seven nutrients can provide comprehensive vision protection. •

References

1. Available at: https://www.cdc.gov/visionhealth/basics/ced/index.html. Accessed June 30, 2021.
2. Available at: https://www.brightfocus.org/macular/article/age-related-macular-facts-figures. Accessed June 29, 2021.
3. Huynh TP, Mann SN, Mandal NA. Botanical compounds: effects on major eye diseases. *Evid Based Complement Alternat Med.* 2013;2013:549174.
4. Widomska J, Subczynski WK. Why has Nature Chosen Lutein and Zeaxanthin to Protect the Retina? *J Clin Exp Ophthalmol.* 2014 Feb 21;5(1):326.
5. Piermarocchi S, Saviano S, Parisi V, et al. Carotenoids in Age-related Maculopathy Italian Study (CARMIS): two-year results of a randomized study. *Eur J Ophthalmol.* 2012 Mar-Apr;22(2):216-25.
6. Wu J, Cho E, Willett WC, et al. Intakes of Lutein, Zeaxanthin, and Other Carotenoids and Age-Related Macular Degeneration During 2 Decades of Prospective Follow-up. *JAMA Ophthalmol.* 2015 Dec;133(12):1415-24.
7. Broadhead GK, Grigg JR, McCluskey P, et al. Saffron therapy for the treatment of mild/moderate age-related macular degeneration: a randomised clinical trial. *Graefes Arch Clin Exp Ophthalmol.* 2019 Jan;257(1):31-40.
8. Falsini B, Piccardi M, Minnella A, et al. Influence of saffron supplementation on retinal flicker sensitivity in early age-related macular degeneration. *Invest Ophthalmol Vis Sci.* 2010 Dec;51(12):6118-24.
9. Available at: https://www.webmd.com/eye-health/macular-degeneration/age-related-macular-degeneration-overview#1. Accessed June 28, 2021.
10. Available at: https://www.merckmanuals.com/home/eye-disorders/retinal-disorders/age-related-macular-degeneration-amd-or-armd. Accessed June 29, 2021.
11. Jia YP, Sun L, Yu HS, et al. The Pharmacological Effects of Lutein and Zeaxanthin on Visual Disorders and Cognition Diseases. *Molecules.* 2017 Apr 20;22(4):610.
12. Rasmussen HM, Johnson EJ. Nutrients for the aging eye. *Clin Interv Aging.* 2013;8:741-8.
13. Ma L, Lin XM. Effects of lutein and zeaxanthin on aspects of eye health. *J Sci Food Agric.* 2010 Jan 15;90(1):2-12.
14. Roberts JE, Dennison J. The Photobiology of Lutein and Zeaxanthin in the Eye. *J Ophthalmol.* 2015;2015:687173.
15. Aimjongjun S, Sutheerawattananonda M, Limpeanchob N. Silk lutein extract and its combination with vitamin E reduce UVB-mediated oxidative damage to retinal pigment epithelial cells. *J Photochem Photobiol B.* 2013 Jul 5;124:34-41.
16. Pongcharoen S, Warnnissorn P, Lertkajornsin O, et al. Protective effect of silk lutein on ultraviolet B-irradiated human keratinocytes. *Biol Res.* 2013;46(1):39-45.

17. Murray IJ, Makridaki M, van der Veen RL, et al. Lutein supplementation over a one-year period in early AMD might have a mild beneficial effect on visual acuity: the CLEAR study. *Invest Ophthalmol Vis Sci.* 2013 Mar 11;54(3):1781-8.
18. Ma L, Dou HL, Huang YM, et al. Improvement of retinal function in early age-related macular degeneration after lutein and zeaxanthin supplementation: a randomized, double-masked, placebo-controlled trial. *Am J Ophthalmol.* 2012 Oct;154(4):625-34 e1.
19. Available at: https://www.medicinenet.com/electroretinography/article.htm. Accessed June 29, 2021.
20. Ma L, Yan SF, Huang YM, et al. Effect of lutein and zeaxanthin on macular pigment and visual function in patients with early age-related macular degeneration. *Ophthalmology.* 2012 Nov;119(11):2290-7.
21. Richer S, Stiles W, Statkute L, et al. Double-masked, placebo-controlled, randomized trial of lutein and antioxidant supplementation in the intervention of atrophic age-related macular degeneration: the Veterans LAST study (Lutein Antioxidant Supplementation Trial). *Optometry.* 2004 Apr;75(4):216-30.
22. Weigert G, Kaya S, Pemp B, et al. Effects of lutein supplementation on macular pigment optical density and visual acuity in patients with age-related macular degeneration. *Invest Ophthalmol Vis Sci.* 2011 Oct 17;52(11):8174-8.
23. Nolan JM, Meagher K, Kashani S, et al. What is *meso*-zeaxanthin, and where does it come from? *Eye (Lond).* 2013 Aug;27(8):899-905.
24. Available at: https://patents.google.com/patent/US6329432B2/en. Accessed June 29, 2021.
25. Bone RA, Landrum JT, Cao Y, et al. Macular pigment response to a supplement containing *meso*-zeaxanthin, lutein and zeaxanthin. *Nutr Metab (Lond).* 2007 May 11;4:12.
26. Dong LY, Jin J, Lu G, et al. Astaxanthin attenuates the apoptosis of retinal ganglion cells in db/db mice by inhibition of oxidative stress. *Mar Drugs.* 2013 Mar 21;11(3):960-74.
27. Izumi-Nagai K, Nagai N, Ohgami K, et al. Inhibition of choroidal neovascularization with an anti-inflammatory carotenoid astaxanthin. *Invest Ophthalmol Vis Sci.* 2008 Apr;49(4):1679-85.
28. Li Z, Dong X, Liu H, et al. Astaxanthin protects ARPE-19 cells from oxidative stress via upregulation of Nrf2-regulated phase II enzymes through activation of PI3K/Akt. *Mol Vis.* 2013;19:1656-66.
29. Lennikov A, Kitaichi N, Fukase R, et al. Amelioration of ultraviolet-induced photokeratitis in mice treated with astaxanthin eye drops. *Mol Vis.* 2012;18:455-64.
30. Cort A, Ozturk N, Akpinar D, et al. Suppressive effect of astaxanthin on retinal injury induced by elevated intraocular pressure. *Regul Toxicol Pharmacol.* 2010 Oct;58(1):121-30.
31. Kidd P. Astaxanthin, cell membrane nutrient with diverse clinical benefits and anti-aging potential. *Altern Med Rev.* 2011 Dec;16(4):355-64.
32. Bosch-Morell F, Villagrasa V, Ortega T, et al. Medicinal plants and natural products as neuroprotective agents in age-related macular degeneration. *Neural Regen Res.* 2020 Dec;15(12):2207-16.
33. Fernandez-Albarral JA, de Hoz R, Ramirez AI, et al. Beneficial effects of saffron (Crocus sativus L.) in ocular pathologies, particularly neurodegenerative retinal diseases. *Neural Regen Res.* 2020 Aug;15(8):1408-16.
34. Sepahi S, Mohajeri SA, Hosseini SM, et al. Effects of Crocin on Diabetic Maculopathy: A Placebo-Controlled Randomized Clinical Trial. *Am J Ophthalmol.* 2018 Jun;190:89-98.
35. Heitmar R, Brown J, Kyrou I. Saffron (Crocus sativus L.) in Ocular Diseases: A Narrative Review of the Existing Evidence from Clinical Studies. *Nutrients.* 2019 Mar 18;11(3).
36. Piccardi M, Marangoni D, Minnella AM, et al. A longitudinal follow-up study of saffron supplementation in early age-related macular degeneration: sustained benefits to central retinal function. *Evid Based Complement Alternat Med.* 2012;2012:429124.
37. Kim EK, Kim H, Vijayakumar A, et al. Associations between fruit and vegetable, and antioxidant nutrient intake and age-related macular degeneration by smoking status in elderly Korean men. *Nutr J.* 2017 Dec 4;16(1):77.
38. Tremblay F, Waterhouse J, Nason J, et al. Prophylactic neuroprotection by blueberry-enriched diet in a rat model of light-induced retinopathy. *J Nutr Biochem.* 2013 Apr;24(4):647-55.
39. Lee SH, Jeong E, Paik SS, et al. Cyanidin-3-glucoside extracted from mulberry fruit can reduce N-methyl-N-nitrosourea-induced retinal degeneration in rats. *Curr Eye Res.* 2014 Jan;39(1):79-87.
40. Li X, Sun M, Long Y. Cyanidin-3-O-Glucoside Attenuates Lipopolysaccharide-Induced Inflammation in Human Corneal Epithelial Cells by Inducing Let-7b-5p-Mediated HMGA2/PI3K/Akt Pathway. *Inflammation.* 2020 Jun;43(3):1088-96.
41. Pawlowska E, Szczepanska J, Koskela A, et al. Dietary Polyphenols in Age-Related Macular Degeneration: Protection against Oxidative Stress and Beyond. *Oxid Med Cell Longev.* 2019;2019:9682318.
42. Ying GS, Maguire MG, Liu C, et al. Night vision symptoms and progression of age-related macular degeneration in the Complications of Age-related Macular Degeneration Prevention Trial. *Ophthalmology.* 2008 Nov;115(11):1876-82.
43. Available at: https://www.ncbi.nlm.nih.gov/books/NBK10850/. Accessed June 29, 2021.
44. Matsumoto H, Nakamura Y, Tachibanaki S, et al. Stimulatory effect of cyanidin 3-glycosides on the regeneration of rhodopsin. *J Agric Food Chem.* 2003 Jun 4;51(12):3560-3.
45. Tirupula KC, Balem F, Yanamala N, et al. pH-dependent interaction of rhodopsin with cyanidin-3-glucoside. 2. Functional aspects. *Photochem Photobiol.* 2009 Mar-Apr;85(2):463-70.
46. Yanamala N, Tirupula KC, Balem F, et al. pH-dependent interaction of rhodopsin with cyanidin-3-glucoside. 1. Structural aspects. *Photochem Photobiol.* 2009 Mar-Apr;85(2):454-62.
47. Nakaishi H, Matsumoto H, Tominaga S, et al. Effects of black current anthocyanoside intake on dark adaptation and VDT work-induced transient refractive alteration in healthy humans. *Altern Med Rev.* 2000 Dec;5(6):553-62.

FIND YOUR WAY

FIND YOUR FOCUS

Do the answers not come as quickly as they used to? A healthy adult brain has as many as 100 billion nerve cells. Supercharge their performance with **Cognitex® Elite.**

The nutrients in this comprehensive brain health formula support youthful memory and cognition to help you stay focused on living your healthiest life.

Item #02396
60 vegetarian tablets

Item #02397
60 vegetarian tablets

These products are available at fine health food stores everywhere.

GLUTEN FREE

NON GMO LE CERTIFIED

DEFEND YOUR HEALTH

VITAMIN D3

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

This product is available at fine health food stores everywhere.

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

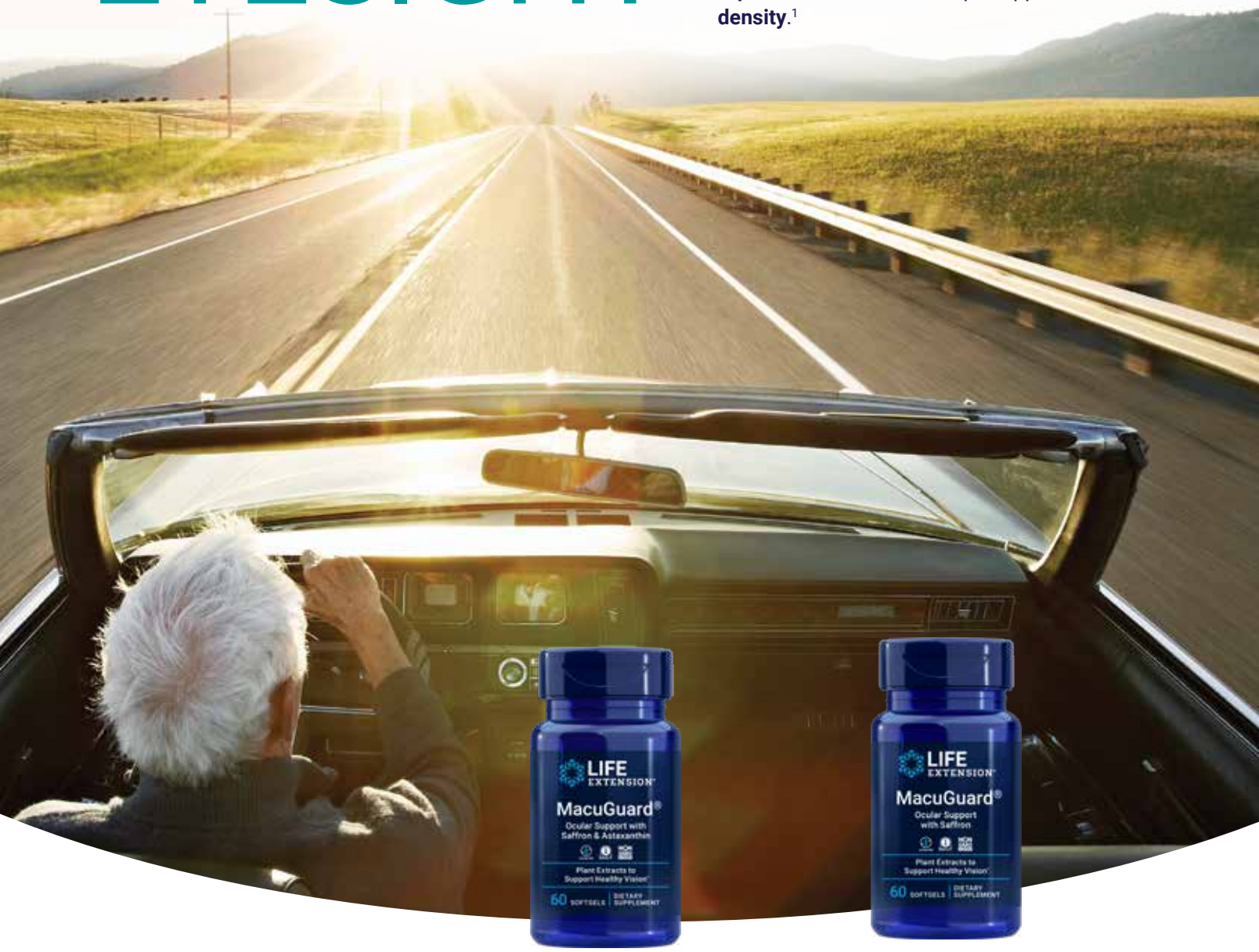
Item #01713

125 mcg (5000 IU) • 60 softgels

FORESIGHT FOR YOUR EYESIGHT

MacuGuard® Ocular Support provides:

- **Lutein**, ***trans*-zeaxanthin**, and **meso-zeaxanthin** help maintain structural integrity of the **macula** and **retina**.[1-5]
- **Cyanidin-3-glucoside** supports night vision.[6-8]
- **Saffron** has been shown to help support **vision** as demonstrated by doctor's eye exams.[1]
- **Alpha-carotene** further helps support **macular density**.[1]



These products are available at fine health food stores everywhere.

References

1. *JAMA Ophthalmol.* 2015;133(12):1415-24.
2. *Nutrients*. 2013 April;5(4):1169-85.
3. *Nutrition.* 2011 Sep;27(9):960-6.
4. *Free Radic Biol Med.* 2012;53(6):1298-307.
5. *J Ophthalmol.* 2015;2015:523027.
6. *Evid Based Complement Alternat Med.* 2012;2012:429124.
7. *Invest Ophthalmol Vis Sci.* 2010;51(12):6118-24.
8. *J Agric Food Chem.* 2003 Jun 4;51(12):3560-3.

MacuGuard® Ocular Support with Saffron & Astaxanthin
Item #01993
60 softgels

MacuGuard® Ocular Support with Saffron
Item #01992
60 softgels

(Each bottle lasts for two months.)
MacuGuard® Ocular Support is available with or without astaxanthin.

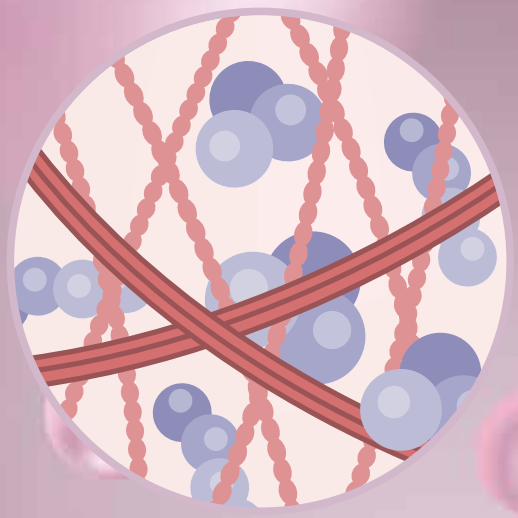
GLUTEN FREE
1 DAILY
NON GMO LE CERTIFIED

Boost Collagen

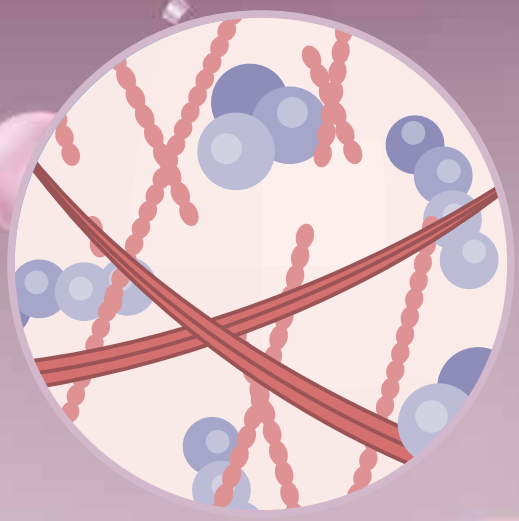
for Smoother Skin and Stronger Nails

BY MICHAEL DOWNEY

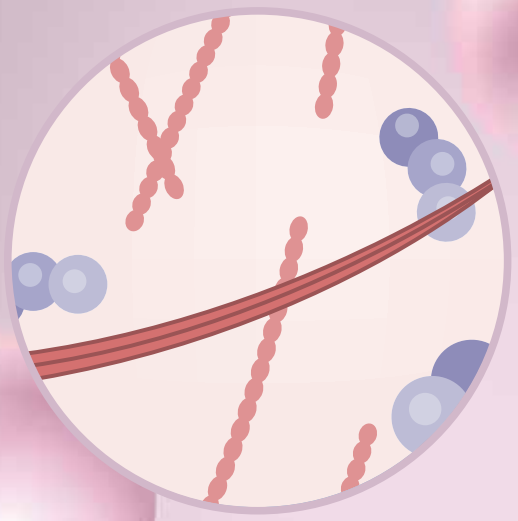
COLLAGEN LEVELS



35 YEARS



45 YEARS



55 YEARS

Collagen is the main protein in all connective tissue in humans.

It's crucial for the health of our **skin** and **nails**.

With **age** and **sun** exposure, our production of **collagen** declines.[1]

The results are visible. Skin sags, develops wrinkles, and becomes marred by cellulite. Nails grow brittle and crack more easily.

To solve this problem, scientists developed **collagen peptides** that, when taken orally, stimulate the body to produce *new* **collagen**.

In clinical studies, these oral **collagen peptides**:[2-5]

- Reduce the volume of eye wrinkles by **20%**,
- Increase skin elasticity by an average of **7%**,
- Reduce cellulite scores by **9%**, and
- Decrease nail breakage by **42%**.

Our Body's Glue

Collagen is the most abundant protein in the human body. The word collagen comes from the Greek word *kola*, meaning "glue," and it is essentially the glue that holds the body together.

It's the main component of most connective tissues, such as tendons and muscle.

Collagen makes up **70%** of the subsurface layer of the skin by weight.[6] It is vital for skin cohesion, firmness, and resilience.[7,8]

It also provides flexibility and is integrated with fibers of **elastin**, the protein that allows the skin to stretch and return to its original shape.

Collagen Drops with Age

Aging has a devastating effect on collagen production.

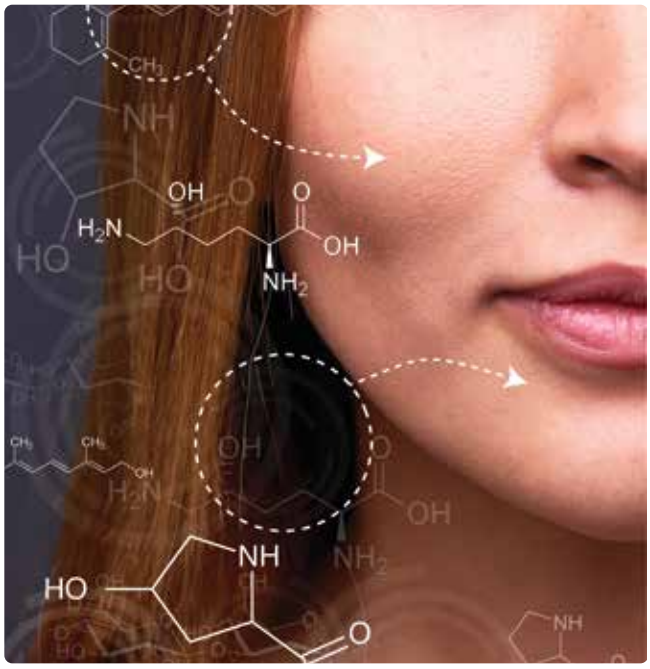
At around age **25**, the cells that produce collagen fibers slow down. The remaining fibers can stiffen, break, and lose shape. Elastin fibers also begin to fray and lose elasticity.

From then on, adults lose about **1%** of their skin collagen each year.[9] After several decades, you may have lost **half** the skin collagen you had at age **18**.[9,10]

Collagen decline accelerates even faster in women after **menopause**. Smoking, high blood sugar, and sun exposure also decrease collagen levels.[11-15]

The result of collagen loss is **visible skin aging**, including thinning, sagging, and wrinkles. [9,10]

But this doesn't have to be inevitable.



Peptides Stimulate New Collagen

Collagen peptides are short chains of amino acids that provide the building blocks for collagen.

In animal studies, scientists showed that hydrolyzed (or partially broken-down) collagen peptides boosted the creation and activity of collagen. This produces stronger, more supple skin.[16]

These collagen peptides also *reduce* the activity of an enzyme (***metalloproteinase 2***) that degrades collagen and hastens skin aging.[16]

Taken orally, these peptides stimulate the production of new collagen and elastin in the skin.[2]

Human trials have demonstrated that an oral collagen peptide is effective in improving skin appearance.[2,3]

Reduced Skin Wrinkles

Researchers conducted a series of **human trials** to test the effects of these collagen peptides on **skin** and **nails**.

In one clinical study, scientists gave oral **collagen peptides** to 114 women, aged 45 to 65, in daily doses of **2.5 grams**.[2]

After ***four weeks***, the volume of eye wrinkles in the collagen group had decreased by **7.2%**, compared with placebo recipients.[2]

After ***eight weeks***, those taking **collagen peptides** showed a stunning **20.1% reduction** in the volume of eye wrinkles.[2]

This research team also measured the structural proteins in the women's **dermal matrix**, the structural framework responsible for skin renewal and vitality. The more proteins, the healthier and more youthful the skin appears.[2]

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

Increased Skin Elasticity

In another study, scientists tested the effect of collagen peptides on **skin elasticity**. This is the skin's ability to stretch and bounce back, rather than sagging.

One group of volunteers received **2.5 grams** of oral **collagen peptides** daily, a second group received **5 grams** daily, and a third received a placebo.

After eight weeks, *both* groups taking the collagen had an average **7% improvement** in skin elasticity.[3]

This improvement in skin elasticity was even *greater* in **women** over age 49.[3]

Remarkably, a treatment subgroup of elderly women still retained higher elasticity than the placebo group *four weeks after* the last dose was taken.[3]

Erasing Cellulite

Collagen was next tested on **cellulite**, the "orange peel" appearance of skin.

Cellulite is caused by fat under the skin bulging into the dermis due to collagen loss and the resulting matrix breakdown.

Restoring dermal architecture can *decrease* the appearance of cellulite by lessening the amount of fat showing through the skin.

Scientists enlisted 105 women, aged 25 to 50, with visible cellulite. One group received **2.5 grams** of oral **collagen peptides** daily. A second group received a placebo.[4]

After six months, collagen *reduced* cellulite by **9%** and decreased thigh-skin waviness by **11.1%**, compared to the placebo.[4]

WHAT YOU NEED TO KNOW

Oral Collagen Builds Healthier Skin and Nails

- **Collagen** supports connective tissue throughout the body. It keeps skin smooth, elastic, and youthful looking. It also helps keep nails strong and healthy.
- Starting at around age **25**, collagen production decreases by about 1% **per year**. This loss of collagen leads to wrinkles, sagging skin, cellulite, and brittle nails.
- **Collagen peptides** improve skin elasticity, reduce the size of eye wrinkles by as much as **20%**, and improve the appearance of cellulite.
- These oral peptides also decrease **nail** brittleness, reducing breaks by **42%** and restoring normal nail growth rate.

Using ultrasound scans of the skin, the researchers noted an evident improvement in dermal density in those who took the peptides. This indicates that the oral collagen helped restore the normal structure of the skin's layers.[4]

Stronger, Healthier Nails

Loss of collagen doesn't just affect the skin. It also results in brittle, ragged **nails**.

In a human trial, 25 healthy women, ages 18 to 50, were given **2.5 grams** of **collagen peptides** once daily for 24 weeks.[5]

The collagen peptides *decreased* the frequency of **nail breakage** by **42%**. They also reduced nail peeling and nail-edge irregularity, and *increased* the nail **growth rate** by **12%**.[5]

Overall, **64%** of participants had an improvement in **nail brittleness**. Four weeks *after treatment stopped*, the benefits were even more pronounced, with **88%** of participants showing significant improvement in nail brittleness.[5]

A whopping **80%** of participants agreed that the collagen treatment improved their nails' appearance and expressed complete satisfaction with the results.[5]

Along with the studies on skin, this result confirms that **oral collagen peptides** can improve the appearance and health of skin and nails.

Summary

After about age **25**, we begin to produce less **collagen**.

Over time, collagen loss results in wrinkled, sagging skin, cellulite, and brittle, breakable nails.

Collagen peptides can *boost* the synthesis of new collagen and elastin.

Clinical trials show that these peptides decrease eye wrinkle size by **20%**, increase skin elasticity, reduce cellulite, and strengthen nails. •

References

1. Varani J, Dame MK, Rittie L, et al. Decreased collagen production in chronologically aged skin: roles of age-dependent alteration in fibroblast function and defective mechanical stimulation. *Am J Pathol*. 2006 Jun;168(6):1861-8.
2. Proksch E, Schunck M, Zague V, et al. Oral intake of specific bioactive collagen peptides reduces skin wrinkles and increases dermal matrix synthesis. *Skin Pharmacol Physiol*. 2014;27(3):113-9.
3. Proksch E, Segger D, Degwert J, et al. Oral supplementation of specific collagen peptides has beneficial effects on human skin physiology: a double-blind, placebo-controlled study. *Skin Pharmacol Physiol.* 2014;27(1):47-55.
4. Schunck M, Zague V, Oesser S, et al. Dietary Supplementation with Specific Collagen Peptides Has a Body Mass Index-Dependent Beneficial Effect on Cellulite Morphology. *J Med Food*. 2015 Dec;18(12):1340-8.
5. Hexsel D, Zague V, Schunck M, et al. Oral supplementation with specific bioactive collagen peptides improves nail growth and reduces symptoms of brittle nails. *J Cosmet Dermatol*. 2017 Aug 08.
6. Available at: https://emedicine.medscape.com/article/1294744-overview#showall. Accessed September 16, 2020.
7. Krieg T, Aumailley M. The extracellular matrix of the dermis: flexible structures with dynamic functions. *Exp Dermatol.* 2011 Aug;20(8):689-95.
8. Frantz C, Stewart KM, Weaver VM. The extracellular matrix at a glance. *J Cell Sci.* 2010 Dec 15;123(Pt 24):4195-200.
9. Ganceviciene R, Liakou AI, Theodoridis A, et al. Skin anti-aging strategies. *Dermatoendocrinol.* 2012 Jul 1;4(3):308-19.
10. Available at: https://www.scientificamerican.com/article/why-does-skin-wrinkle-wit/. Accessed September 16, 2020.
11. Gautieri A, Passini FS, Silvan U, et al. Advanced glycation end-products: Mechanics of aged collagen from molecule to tissue. *Matrix Biol*. 2017 May;59:95-108.
12. Uitto J. The role of elastin and collagen in cutaneous aging: intrinsic aging versus photoexposure. *J Drugs Dermatol*. 2008 Feb;7(2 Suppl):s12-6.
13. Danby FW. Nutrition and aging skin: sugar and glycation. *Clin Dermatol.* 2010 Jul-Aug;28(4):409-11.
14. Knuutinen A, Kokkonen N, Risteli J, et al. Smoking affects collagen synthesis and extracellular matrix turnover in human skin. *Br J Dermatol*. 2002 Apr;146(4):588-94.
15. Bosch R, Philips N, Suarez-Perez JA, et al. Mechanisms of Photoaging and Cutaneous Photocarcinogenesis, and Photoprotective Strategies with Phytochemicals. *Antioxidants (Basel)*. 2015 Mar 26;4(2):248-68.
16. Zague V, de Freitas V, da Costa Rosa M, et al. Collagen hydrolysate intake increases skin collagen expression and suppresses matrix metalloproteinase 2 activity. *J Med Food.* 2011 Jun;14(6):618-24.

CoQ10

Fuel for Heart | Mind | Muscle

CoQ10 helps fuel energy production at the cellular level—and **ubiquinol** *absorbs* eight times better than standard CoQ10. This means you'll have the body energy you need to power your brain, liver, kidneys, and heart.

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

Item #01426

100 mg • 60 softgels

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.

SUPPORT HEALTHY IMMUNE FUNCTION

Mushroom Immune

with BETA GLUCANS

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
- Encourage a healthy **gut microbiota**

GLUTEN FREE

NON GMO LE CERTIFIED

Item #02426

30 vegetarian capsules
(Suggested dose is one capsule daily)

This product is available at fine health food stores everywhere.

REJUVENATE YOUR SKIN FROM WITHIN

Restore Collagen AND Hyaluronic Acid

WITH DELIGHTFUL GUMMIES

Oral ingestion of **collagen peptides** and **hyaluronic acid** boosts these rejuvenating factors in normal, aging skin.

Clinical results reveal improved skin elasticity, increased moisture, and a **20%** reduction in the appearance of eye wrinkles.

The **Gummy Science™ Youthful Collagen** formula provides clinically studied doses with daily intake of 4 tasty **chewable gummies**.[1,2]

No added sugars.

This product is available at fine health food stores everywhere.

Item #02304

80 gummies

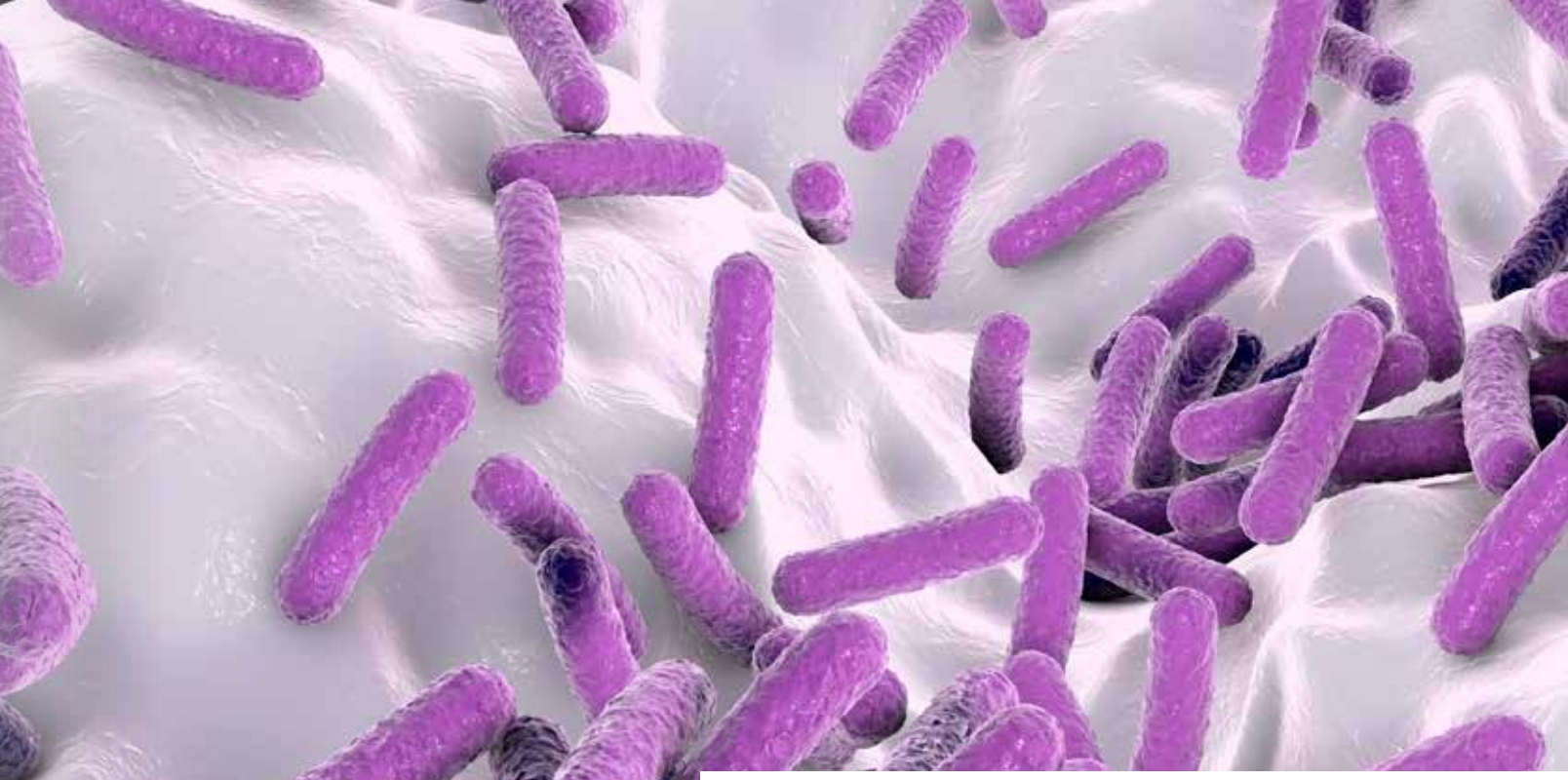
GLUTEN FREE

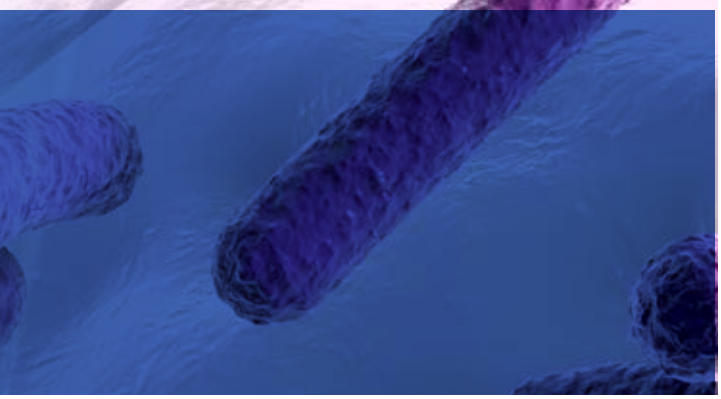
NON GMO LE CERTIFIED

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

REFUEL YOUR IMMUNE SYSTEM

BY MICHAEL DOWNEY





With age, **immune function** markedly declines along with the body's natural defenses.[1]

Until a method to fully reverse this degenerative process is validated, the following nutrients can help support a healthy immune response:

- **Vitamin C**
- **Quercetin**
- **Vitamin D**
- **Zinc**
- **Probiotic *Lactobacillus rhamnosus* CRL1505**
- ***S. cerevisiae* fermentate**

Taking these daily may help defend against infectious agents.

Vitamin C

The activity of many **immune cells** is closely related to their **vitamin C** content.

This is especially true for ***phagocytes***, the cells that engulf and destroy bacteria and other infecting organisms, and ***T-cells***, which regulate and direct other immune cells.[2]

Studies show that some **immune functions** can be improved by taking **vitamin C**.[3,4]

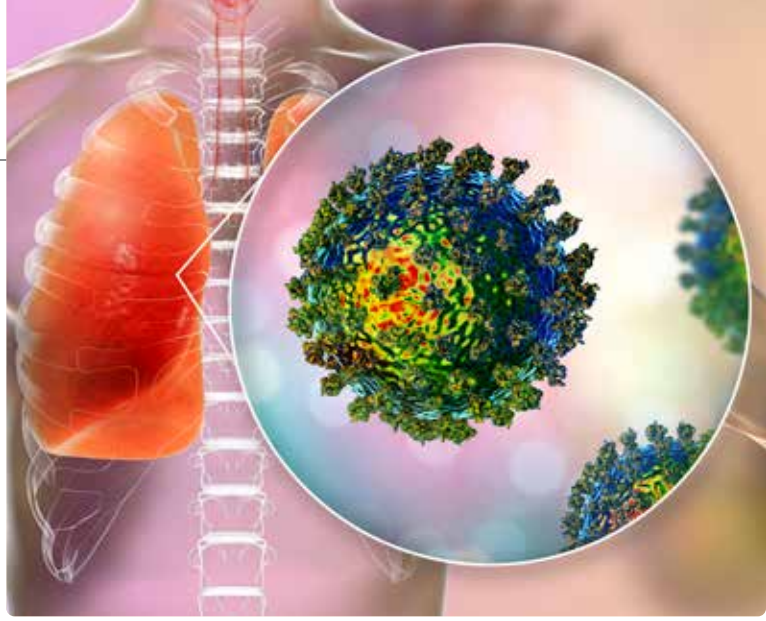
For example, vitamin C *deficiency* is associated in some studies with *increased* frequency and duration of **colds**.[4]

In a human clinical study, oral intake of vitamin C has been shown to *reduce* the duration of colds by an average of **9.4%.** It may also help prevent viral **respiratory tract infections** and reduce their severity.[5]

Evidence from basic research shows that vitamin C promotes a healthy immune system by:

- Enhancing the function and promoting the growth, maturation, and survival of **immune cells** that fight infection,[6,7]
- Increasing levels of **interferons**, the "warning signals" produced by the body that trigger protective immune mechanisms,[8]
- Neutralizing excess **free radicals** caused by infections, limiting oxidative damage and reducing severity of illness,[9]
- Aiding in the production of the structural protein **collagen**, which allows our skin and the linings of our respiratory and digestive tracts to maintain a protective barrier against infection,[10]
- Lowering levels of **histamine**, a pro-inflammatory compound[11] that plays a role in infections,[12] and causes symptoms of allergy,[13,14] and
- As indicated by preclinical studies, vitamin C plays a role in reducing excess levels of other **pro-inflammatory** compounds, countering inflammation caused by infection and injury, and promoting tissue healing.

The human body cannot produce or effectively store vitamin C. What that means is, in order to maintain optimal immunity, it's a great idea to replenish your supply through daily supplementation.



Quercetin

Research has shown that the plant flavonoid **quercetin** can support a prompt immune response to common **colds** and other **upper respiratory tract infections**. These studies found that adults taking quercetin were less likely to develop these illnesses.

One study found that only **5%** of people taking **quercetin** got sick during a two-week period (after three days of intense workouts), while **45%** of those taking a **placebo** developed colds.[19]

In another study of physically fit middle-aged and older adults, daily quercetin intake reduced the number of sick days taken for **colds** by **31%** and reduced the ***severity*** of symptoms by **36%**.[20]

Quercetin may also be effective against **bacterial** infections.

In animal studies, it's been shown to decrease the infection rate and inflammatory response to *Helicobacter pylori*, the cause of many **ulcers** and some potential **cancers** of the stomach.[21,22]

Quercetin also reduced **inflammatory** responses and strengthened host defenses against ***Salmonella*** bacteria in a cell-based model of infection.[23]

Salmonella bacteria cause roughly **26,500 hospitalizations** in the U.S. every year and are especially dangerous in older adults.[24]

Evidence from epidemiological studies shows that people with the *highest* quercetin intake have *reduced risk* for many different deadly cancers, including **lung**, **colon**, and **gastric cancers**.[25-27]

It can be difficult for the body to **absorb** quercetin.[28]

Researchers solved this problem by integrating it into a **phytosome**, a type of fatty substance that serves as a carrier. This makes it up to ***50 times more bioavailable*** (absorbable) than standard quercetin.[29]

Vitamin D

Vitamin D fortifies the **immune system,** helping to protect the body from infections, and lessening their severity. It may do this by:[30-34]

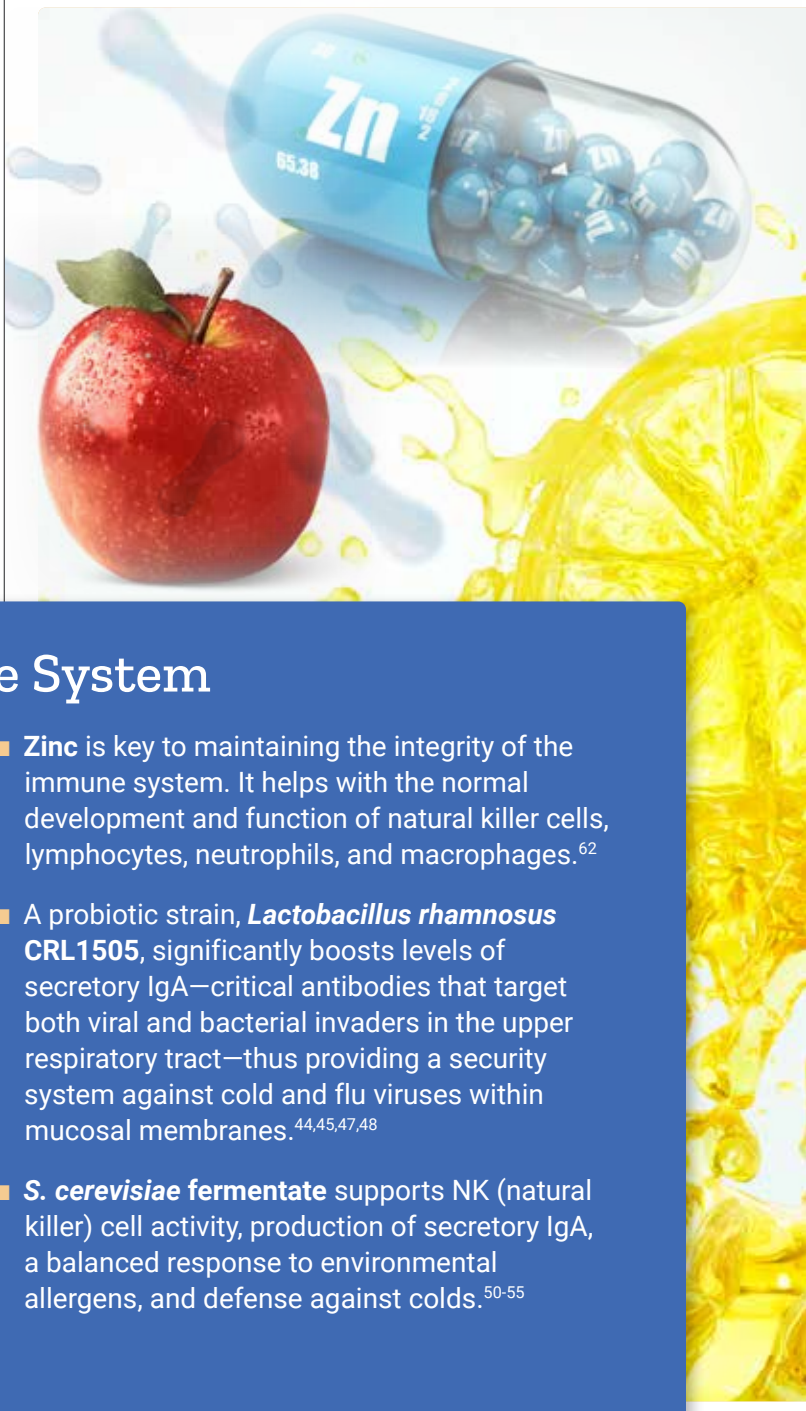
- Interfering with the ability of viruses to **replicate**,
- Supporting and helping to repair cellular linings in the body, including **lung airways**,
- Boosting production of proteins that are protective against **infection**, and
- Helping to prevent the immune system from producing *excess* **pro-inflammatory** compounds in the lungs.

Meta-analyses of clinical trials have shown that vitamin D protects against **respiratory tract infections**.[35,36]

In addition, *low* vitamin D levels are associated with *higher* rates of many **chronic diseases**, including cardiovascular disease, cognitive decline, and cancer.[37]

Annual blood tests can let people know whether they are taking the correct dosage to ensure optimal blood levels of vitamin D.

If you do not already maintain an optimal blood level of *25-hydroxyvitamin D* of **50** to **80 ng/mL**, then take between **5,000** to **8,000 IU** of vitamin D daily, with meals.



WHAT YOU NEED TO KNOW

Support a Healthy Immune System

- In order to live long, healthy lives, we need our **immune system** to function at peak form on a daily basis. Several nutrients can help do that.
- **Vitamin C** helps increase levels of antibody-producing cells (lymphocytes), boosts function of infection-engulfing neutrophils, and helps NK (natural killer) cell activity.[56,57]
- **Quercetin** reduces inflammatory immune cells, cuts histamine levels, relaxes airway smooth muscle, inhibits replication and infectivity of cold-causing viruses, and reduces senescent cells and their pro-inflammatory signaling.[58-60]
- **Vitamin D** interferes with virus replication and modulates the immune response via receptors on various immune cell types, thus supporting antimicrobial defenses while limiting inflammatory signaling.[61]
- **Zinc** is key to maintaining the integrity of the immune system. It helps with the normal development and function of natural killer cells, lymphocytes, neutrophils, and macrophages.[62]
- A probiotic strain, ***Lactobacillus rhamnosus* CRL1505**, significantly boosts levels of secretory IgA—critical antibodies that target both viral and bacterial invaders in the upper respiratory tract—thus providing a security system against cold and flu viruses within mucosal membranes.[44,45,47,48]
- ***S. cerevisiae* fermentate** supports NK (natural killer) cell activity, production of secretory IgA, a balanced response to environmental allergens, and defense against colds.[50-55]

Zinc

Zinc deficiency is quite common in the elderly.[38] It is thought to result from reduced zinc consumption and absorption in older individuals.[39]

This may compromise the function of the **immune system** and contribute to atherosclerosis, cancer, neurological disorders, autoimmune diseases, and other age-related conditions.[40,41]

The decline in immune function that happens with aging has been associated with both disease and death.[42]

By restoring zinc levels, aging adults may be able to partially slow immune function decline and protect against **chronic inflammation**.

Oral intake of **zinc** in the elderly has been shown to boost the stress response of **white blood cells**, providing an immune system anti-aging mechanism.[43]

Probiotic *L. rhamnosus* CRL1505

The immune system makes proteins called **antibodies** that fight bacteria, viruses, and toxins.

One of the most common antibodies, called **secretory IgA** (immunoglobulin A), is found in mucosal membranes.

IgA acts as the body's built-in security system within mucosal membranes that line the nose and upper respiratory tract.[44]

Having adequate **IgA** levels is critical because these **antibodies** target both viral and bacterial invaders in the upper respiratory tract. This IgA activity can prevent cold and flu viruses from gaining a foothold and wreaking havoc on the respiratory tract.[44]

Scientists studying the beneficial live microorganisms known as **probiotics** identified a specific bacterial strain that, in a preclinical model, significantly *increased* levels of **secretory IgA**.[45]

Originally isolated from goat's milk in northwestern Argentina,[46] the bacterium ***Lactobacillus rhamnosus* CRL1505** has been shown in preclinical studies to help inhibit viruses and bacteria that can cause:[45,47]

- Common colds,
- Influenza,
- Bronchitis, and
- Pneumonia.

In a clinical trial, one group of healthy male and female children consumed a yogurt drink five days a week that contained **100 million CFU** (colony-forming units) of ***L. rhamnosus* CRL1505**. A second group consumed a drink that did *not* contain the probiotic.

The children ranged in age from two to five years, a population that is particularly susceptible to **respiratory infections**.[48]

Over six months, compared to the placebo group, the children in the **probiotic** group had:[48]

- **61%** fewer cases of **tonsillitis** and **pharyngitis** (a throat infection),
- **55%** fewer cases of **cold** or **flu**,
- **49%** fewer **infections**,
- **46%** fewer cases of **fever**, and
- **33%** less need for **antibiotic** use.

Daily intake of ***L. rhamnosus* CRL1505** can provide protection against viral and bacterial infections.

S. cerevisiae fermentate Fights Allergies and Provides Immune Benefits

The immune effects of ***S. cerevisiae* fermentate** were discovered by accident.

A company in Cedar Rapids, Iowa, had been producing a specialized yeast culture when it became apparent that its factory workers—who were exposed

to the yeast daily, through inhalation—were taking far fewer sick days than its office workers.[49]

***S. cerevisiae* fermentate** helps promote the body's immune response when it encounters environmental allergens, like pollen.

At least six placebo-controlled clinical trials have validated its ability to protect against allergies and colds.[50-55]

In one study, subjects took either **500 mg** of ***S. cerevisiae* fermentate** daily or a **placebo** for five weeks during the beginning of allergy season.[50]

Subjects in the placebo group did not see a change in their seasonal allergies.

The group supplementing with the ***S. cerevisiae* fermentate** saw improvements. **Half** of the treated male volunteers reported a **complete absence of allergy symptoms**, which returned within two weeks once they stopped taking the yeast fermentate.

In two other studies, subjects receiving ***S. cerevisiae* fermentate** reported shorter duration of symptoms and better response to immune challenge, compared to those taking a placebo.[53,54]

***S. cerevisiae* fermentate** appears to work by promoting **natural killer** cell activity as well as the production of **secretory IgA**—two key players in our body's immune defenses.[50,51]

In one study, subjects taking **500 mg** of ***S. cerevisiae* fermentate** daily for eight weeks experienced an increase in **secretory IgA**.[50]

A placebo-controlled, double-blind study found that yeast fermentate increased markers of natural killer cell activity—after just a single **500 mg** dose.[51]

Summary

Aging weakens the **immune system**, leaving us vulnerable to viral and bacterial infections, including colds, flu, and upper respiratory infections—and increases the risk of cancer.

Select nutrients help the immune system function optimally to kill pathogens, and can help prevent the chronic, low-level inflammation that is associated with numerous degenerative diseases linked to aging.

These critical nutrients include **vitamin C**, **quercetin**, **vitamin D**, **zinc**, the probiotic strain ***L. rhamnosus* CRL1505** and ***S. cerevisiae* fermentate**.

They can help support a healthy immune system and may offer protection against viral and bacterial infection, cancers, and other illnesses. •

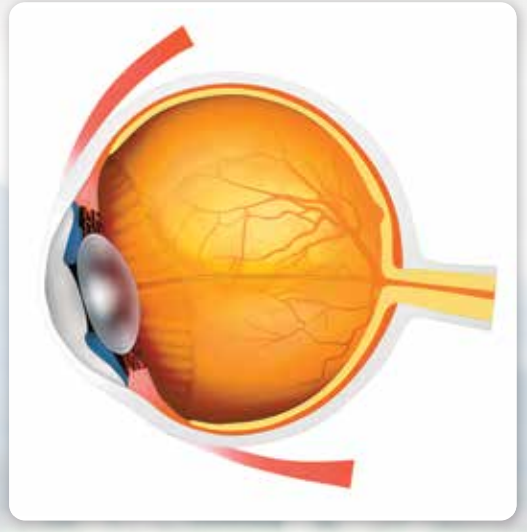
References

1. Aiello A, Farzaneh F, Candore G, et al. Immunosenescence and Its Hallmarks: How to Oppose Aging Strategically? A Review of Potential Options for Therapeutic Intervention. *Front Immunol*. 2019;10:2247.
2. Strohle A, Wolters M, Hahn A. Micronutrients at the interface between inflammation and infection--ascorbic acid and calciferol: part 1, general overview with a focus on ascorbic acid. *Inflamm Allergy Drug Targets.* 2011 Feb;10(1):54-63.
3. Wintergerst ES, Maggini S, Hornig DH. Immune-enhancing role of vitamin C and zinc and effect on clinical conditions. *Ann Nutr Metab.* 2006;50(2):85-94.
4. Johnston CS, Barkyoumb GM, Schumacher SS. Vitamin C supplementation slightly improves physical activity levels and reduces cold incidence in men with marginal vitamin C status: a randomized controlled trial. *Nutrients.* 2014 Jul 9;6(7):2572-83.
5. Hemila H. Vitamin C and Infections. *Nutrients.* 2017 Mar 29;9(4).
6. Huijskens MJ, Walczak M, Koller N, et al. Technical advance: ascorbic acid induces development of double-positive T cells from human hematopoietic stem cells in the absence of stromal cells. *J Leukoc Biol.* 2014 Dec;96(6):1165-75.
7. Huijskens MJ, Walczak M, Sarkar S, et al. Ascorbic acid promotes proliferation of natural killer cell populations in culture systems applicable for natural killer cell therapy. *Cytotherapy.* 2015 May;17(5):613-20.
8. Available at: https://lpi.oregonstate.edu/mic/health-disease/immunity. Accessed June 18, 2021.
9. Iqbal K, Khan A, Khan Khattak MA. Biological significance of ascorbic acid (vitamin C) in human health - a review. *Pakistan Journal of Nutrition.* 2004;3(1):5-13.
10. Carr AC, Maggini S. Vitamin C and Immune Function. *Nutrients.* 2017 Nov 3;9(11).
11. Branco A, Yoshikawa FSY, Pietrobon AJ, et al. Role of Histamine in Modulating the Immune Response and Inflammation. *Mediators Inflamm.* 2018 2018/08/27;2018:9524075.
12. Smuda C, Bryce PJ. New developments in the use of histamine and histamine receptors. *Curr Allergy Asthma Rep.* 2011 Apr;11(2):94-100.
13. Johnston CS, Martin LJ, Cai X. Antihistamine effect of supplemental ascorbic acid and neutrophil chemotaxis. *J Am Coll Nutr.* 1992 Apr;11(2):172-6.
14. Johnston CS, Solomon RE, Corte C. Vitamin C depletion is associated with alterations in blood histamine and plasma free carnitine in adults. *J Am Coll Nutr.* 1996 Dec;15(6):586-91.
15. Mohammed BM, Fisher BJ, Kraskauskas D, et al. Vitamin C promotes wound healing through novel pleiotropic mechanisms. *Int Wound J.* 2016 Aug;13(4):572-84.
16. Gao YL, Lu B, Zhai JH, et al. The Parenteral Vitamin C Improves Sepsis and Sepsis-Induced Multiple Organ Dysfunction Syndrome via Preventing Cellular Immunosuppression. *Mediators Inflamm.* 2017;2017:4024672.

17. Kim Y, Kim H, Bae S, et al. Vitamin C Is an Essential Factor on the Anti-viral Immune Responses through the Production of Interferon-alpha/beta at the Initial Stage of Influenza A Virus (H3N2) Infection. *Immune Netw.* 2013 Apr;13(2):70-4.
18. Mohammed BM, Fisher BJ, Kraskauskas D, et al. Vitamin C: a novel regulator of neutrophil extracellular trap formation. *Nutrients.* 2013 Aug 9;5(8):3131-51.
19. Nieman DC, Henson DA, Gross SJ, et al. Quercetin reduces illness but not immune perturbations after intensive exercise. *Med Sci Sports Exerc.* 2007 Sep;39(9):1561-9.
20. Heinz SA, Henson DA, Austin MD, et al. Quercetin supplementation and upper respiratory tract infection: A randomized community clinical trial. *Pharmacol Res.* 2010 Sep;62(3):237-42.
21. Gonzalez-Segovia R, Quintanar JL, Salinas E, et al. Effect of the flavonoid quercetin on inflammation and lipid peroxidation induced by Helicobacter pylori in gastric mucosa of guinea pig. *J Gastroenterol.* 2008;43(6):441-7.
22. Brown JC, Wang J, Kasman L, et al. Activities of muscadine grape skin and quercetin against Helicobacter pylori infection in mice. *J Appl Microbiol.* 2011 Jan;110(1):139-46.
23. Paolillo R, Carratelli CR, Rizzo A. Effect of resveratrol and quercetin in experimental infection by Salmonella enterica serovar Typhimurium. *Int Immunopharmacol.* 2011 Feb;11(2):149-56.
24. Available at: https://www.cdc.gov/salmonella/index.html. Accessed June 15, 2021.
25. Lam TK, Rotunno M, Lubin JH, et al. Dietary quercetin, quercetin-gene interaction, metabolic gene expression in lung tissue and lung cancer risk. *Carcinogenesis.* 2010 Apr;31(4):634-42.
26. Theodoratou E, Kyle J, Cetnarskyj R, et al. Dietary flavonoids and the risk of colorectal cancer. *Cancer Epidemiol Biomarkers Prev.* 2007 Apr;16(4):684-93.
27. Ekstrom AM, Serafini M, Nyren O, et al. Dietary quercetin intake and risk of gastric cancer: results from a population-based study in Sweden. *Ann Oncol.* 2011 Feb;22(2):438-43.
28. Rich GT, Buchweitz M, Winterbone MS, et al. Towards an Understanding of the Low Bioavailability of Quercetin: A Study of Its Interaction with Intestinal Lipids. *Nutrients.* 2017 Feb 5;9(2).
29. Supplier Internal Study. A randomized and crossover pharmacokinetic study of Quercetin 500mg., Quercetin Phytosome 500 mg. and Quercetin Phytosome 250 mg. administered in a single dose to healthy volunteers under fasting conditions. Data on File. 2017.
30. Dancer RC, Parekh D, Lax S, et al. Vitamin D deficiency contributes directly to the acute respiratory distress syndrome (ARDS). *Thorax.* 2015 Jul;70(7):617-24.
31. Teymoori-Rad M, Shokri F, Salimi V, et al. The interplay between vitamin D and viral infections. *Rev Med Virol.* 2019 Mar;29(2):e2032.
32. Telcian AG, Zdrenghea MT, Edwards MR, et al. Vitamin D increases the antiviral activity of bronchial epithelial cells in vitro. *Antiviral Res.* 2017 Jan;137:93-101.
33. Zdrenghea MT, Makrinioti H, Bagacean C, et al. Vitamin D modulation of innate immune responses to respiratory viral infections. *Rev Med Virol.* 2017 Jan;27(1).
34. Tsujino I, Ushikoshi-Nakayama R, Yamazaki T, et al. Pulmonary activation of vitamin D3 and preventive effect against interstitial pneumonia. *J Clin Biochem Nutr.* 2019 Nov;65(3):245-51.
35. Martineau AR, Jolliffe DA, Hooper RL, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ.* 2017 Feb 15;356:i6583.
36. Bergman P, Lindh AU, Bjorkhem-Bergman L, et al. Vitamin D and Respiratory Tract Infections: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *PLoS One.* 2013;8(6):e65835.
37. Meehan M, Penckofer S. The Role of Vitamin D in the Aging Adult. *J Aging Gerontol.* 2014 Dec;2(2):60-71.
38. Barnett JB, Hamer DH, Meydani SN. Low zinc status: a new risk factor for pneumonia in the elderly? *Nutr Rev.* 2010 Jan;68(1):30-7.
39. Available at: https://www.todaysgeriatricmedicine.com/news/ex_013113.shtml. Accessed June 18, 2021.
40. Chasapis CT, Loutsidou AC, Spiliopoulou CA, et al. Zinc and human health: an update. *Arch Toxicol.* 2012 Apr;86(4):521-34.
41. Haase H, Rink L. The immune system and the impact of zinc during aging. *Immun Ageing.* 2009 Jun 12;6:9.
42. Pae M, Meydani SN, Wu D. The role of nutrition in enhancing immunity in aging. *Aging Dis.* 2012 Feb;3(1):91-129.
43. Putics A, Vodros D, Malavolta M, et al. Zinc supplementation boosts the stress response in the elderly: Hsp70 status is linked to zinc availability in peripheral lymphocytes. *Exp Gerontol.* 2008 May;43(5):452-61.
44. Available at: https://www.sciencedirect.com/topics/neuroscience/secretory-immunoglobulin. Accessed July 18, 2021.
45. Salva S, Villena J, Alvarez S. Immunomodulatory activity of Lactobacillus rhamnosus strains isolated from goat milk: impact on intestinal and respiratory infections. *Int J Food Microbiol.* 2010 Jun 30;141(1-2):82-9.
46. Reid G, Kort R, Alvarez S, et al. Expanding the reach of probiotics through social enterprises. *Benef Microbes.* 2018 Sep 18;9(5):707-15.
47. Zelaya H, Tsukida K, Chiba E, et al. Immunobiotic lactobacilli reduce viral-associated pulmonary damage through the modulation of inflammation-coagulation interactions. *Int Immunopharmacol.* 2014 Mar;19(1):161-73.
48. Villena J SS, Núñez M, Corzo J, Tolaba R, Faedda J, Font G, Alvarez S. Probiotics for everyone! The novel immunobiotic Lactobacillus rhamnosus CRL1505 and the beginning of social probiotic programs in Argentina. 2012.
49. Available at: https://epicorimmune.com/our-origin/. Accessed June 18, 2021.
50. Jensen GS, Patterson, K.M., Barnes, J., Schauss, A.G., Beaman, R., Reeves, S.G. and Robinson, L.E.,. A double-blind placebo-controlled, randomized pilot study: consumption of a high-metabolite immunogen from yeast culture has beneficial effects on erythrocyte health and mucosal immune protection in healthy subjects. *The Open Nutrition Journal.* 2008;2:pp.68-75.
51. Jensen GS, Redman KA, Benson KF, et al. Antioxidant bioavailability and rapid immune-modulating effects after consumption of a single acute dose of a high-metabolite yeast immunogen: results of a placebo-controlled double-blinded crossover pilot study. *J Med Food.* 2011 Sep;14(9):1002-10.
52. Moyad MA, Robinson LE, Kittelsrud JM, et al. Immunogenic yeast-based fermentation product reduces allergic rhinitis-induced nasal congestion: a randomized, double-blind, placebo-controlled trial. *Adv Ther.* 2009 Aug;26(8):795-804.
53. Moyad MA, Robinson LE, Zawada ET, et al. Immunogenic yeast-based fermentate for cold/flu-like symptoms in nonvaccinated individuals. *J Altern Complement Med.* 2010 Feb;16(2):213-8.
54. Moyad MA, Robinson LE, Zawada ET, Jr., et al. Effects of a modified yeast supplement on cold/flu symptoms. *Urol Nurs.* 2008 Feb;28(1):50-5.
55. Jensen GS, Carter SG, Reeves SG, et al. Anti-inflammatory properties of a dried fermentate in vitro and in vivo. *J Med Food.* 2015 Mar;18(3):378-84.
56. Available at: https://lpi.oregonstate.edu/mic/vitamins/vitamin-C. Accessed June 24, 2021.
57. Heuser G, Vojdani A. Enhancement of natural killer cell activity and T and B cell function by buffered vitamin C in patients exposed to toxic chemicals: the role of protein kinase-C. *Immunopharmacol Immunotoxicol.* 1997 Aug;19(3):291-312.
58. Ganesan S, Faris AN, Comstock AT, et al. Quercetin inhibits rhinovirus replication in vitro and in vivo. *Antiviral Res.* 2012 Jun;94(3):258-71.
59. Mlcek J, Jurikova T, Skrovankova S, et al. Quercetin and Its Anti-Allergic Immune Response. *Molecules.* 2016 May 12;21(5).
60. Zhu Y, Tchkonia T, Pirtskhalava T, et al. The Achilles' heel of senescent cells: from transcriptome to senolytic drugs. *Aging Cell.* 2015 Aug;14(4):644-58.
61. Aranow C. Vitamin D and the immune system. *J Investig Med.* 2011 Aug;59(6):881-6.
62. Available at: https://lpi.oregonstate.edu/mic/minerals/zinc. Accessed June 24, 2021.

EYE
PRESSURE SUPPORT

Eye Pressure Support with Mirtogenol® is designed to support blood flow in tiny vessels of the eyes, helping to promote healthy fluid pressure.



Item #01514

30 vegetarian capsules

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

Mirtogenol® is a registered trademark of Horphag Research, Ltd.

BROAD-SPECTRUM IMMUNE SUPPORT

Lactoferrin is a component of **whey protein** best known for its **immune benefits**.

An array of published studies describes how **lactoferrin** supports innate and adaptive **immune** responses.

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

Item #01681 • 60 vegetarian capsules

(Two-Month Supply)

Contains milk.

GRAB 'N GO!

Daily Immune Support for $1 a Day!

Everything you need for daily immune support in one easy-to-grab, travel-ready packet.

- **Vitamin C 1,000 mg with Bio-Quercetin® Phytosome**: *Promotes antibody-producing cells.*[1]
- **Vitamin D3 125 mcg (5000 IU)**: *Supports immune defenses.*
- **Zinc 50 mg**: *Promotes normal development of NK cells.*[2]
- **Probiotic *L. rhamnosus* CRL1505 and *S. cerevisiae* fermentate**: *Promotes secretory IgA production.*[3-5]

Take one pack **daily** to help promote a healthy, balanced, year-round immune response.

References

1. Available at: https://lpi.oregonstate.edu/mic/vitamins/vitamin-C. Accessed June 24, 2021.
2. Available at: https://lpi.oregonstate.edu/mic/minerals/zinc. Accessed June 24, 2021.
3. *The Open Nutrition Journal.* 2008;2:pp.68-75.
4. *International Journal of Biotechnology for Wellness Industries.* 2012;1:189-98.
5. *Adv Ther.* 2009 Aug;26(8):795-804.

Immune Packs with Vitamin C & D, Zinc and Probiotic

Item #02425

30 packets

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

A European Solution for MENOPAUSE SYMPTOMS

BY MARSHA MCCULLOCH, RD

Hot flashes are one of the dreaded miseries women experience as they go through **menopause**.[1]

These "heat waves" are one of ***11*** **common menopausal symptoms**.

Sleep difficulties, mood swings and irritability, and vaginal dryness are also prevalent problems.[2]

For women who prefer to avoid **hormone** treatments, there's another solution.

A *standardized* **Siberian rhubarb** is used in **Europe** as an alternative. It has been shown to improve all ***11*** **common menopausal symptoms**.

Human studies show that this **Siberian rhubarb** extract can reduce overall symptom severity **up to 83%**.[3]

The 11 Common Symptoms of Menopause

Menopause is marked by 12 consecutive months without a menstrual period. It generally occurs at around age **51**, though symptoms can start several years earlier, during **perimenopause**.[4]

As **estrogen** and **progesterone** levels decline during the menopausal transition, women can be affected physically and psychologically.[2]

A frequently used tool to assess menopause symptoms is the **Menopause Rating Scale**.[5]

It includes **11** common concerns:[5]

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

There is a non-hormonal way to address *all* of these **menopausal** symptoms.[6]

A European Solution

Most of the symptoms of **menopause** are caused by a drop in levels of the hormone **estrogen**.

Estrogen binds to **receptor sites** on cell membranes to activate beneficial and sometimes detrimental cellular processes, including excess proliferation.

Activating the **ER-*beta*** receptor promotes beneficial effects on skin, brain, bone, cardiovascular, and other tissues. This can support menopausal symptom relief.

Activating the **ER-*alpha*** receptor, on the other hand, can produce undesirable growth in some tissues, including initiating and promoting cancer.

Increased activity of the **ER-*alpha*** receptor is believed to cause many of the ill effects of conventional hormone-replacement therapy for menopausal symptoms.[9]

For nearly ***three decades***, German practitioners have been recommending a standardized extract from the roots of the **Siberian rhubarb** plant to safely treat these symptoms.[7]

In preclinical studies, these plant compounds have shown greater affinity for the beneficial **estrogen receptor-*beta*** (ER-*beta*) than for potentially detrimental **estrogen receptor-*alpha*** (ER-*alpha*).[8]

Siberian rhubarb extract didn't activate ***ER-alpha***.[8]

The ability of **Siberian rhubarb** extract to selectively activate **ER-*beta*** but not **ER-*alpha*** is a key reason for its safety.[10]

Proven in Human Studies

In a double-blind clinical trial, 109 symptomatic perimenopausal women took **4 mg** of **Siberian rhubarb extract** or a **placebo** daily for three months.

Within **one month**, the Siberian rhubarb extract group had a significant reduction in the number and severity of **hot flashes**.

By nearly **three months**, they had a **54%** overall improvement in the severity of menopause symptoms, based on the **Menopause Rating Scale**.[11]

These results were confirmed in a similarly designed clinical trial of 112 perimenopausal women, which produced similar results, including an **83%** reduction in the median number and severity of daily **hot flashes**.[12]

After completing the first trial, the scientists continued to follow the women taking Siberian rhubarb extract for up to two years.[3]

WHAT YOU NEED TO KNOW

Natural and Effective Menopause Relief

- **Menopause** is marked by **11** common symptoms, including **hot flashes**, sleep difficulty, joint and muscle pain, mood disturbances, sexual problems, bladder issues, vaginal dryness, and more.
- Multiple human studies show that **Siberian rhubarb root extract** provides relief from ***all 11 symptoms*** on the Menopause Rating Scale and reduces overall symptom severity by up to **83%**.
- Siberian rhubarb extract has been widely used in Germany for **decades** and has an **excellent safety profile**, based on extensive clinical, preclinical, and lab studies.

The women had a remarkable ***83% reduction*** in the severity of menopause symptoms within the first year. This improvement was *maintained* during the second year of follow-up.[3]

In an open-label observational study, 252 symptomatic perimenopausal or postmenopausal women also took **4 mg** of **Siberian rhubarb extract** daily. After six months, **56%** reported *major improvements* and **13%** reported complete recovery from their symptoms.[13]

The *largest improvements* in symptom severity were for hot flashes, sleep problems, and irritability.[13]

In all these studies, Siberian rhubarb extract produced significant improvement in ***every one*** of the **11 symptoms** on the Menopause Rating Scale.[3,11-13]

Ending Hot Flashes

Hot flashes and night sweats affect up to **50%** of perimenopausal and up to **85%** of postmenopausal women.[14,15]

Hot flashes typically continue for **five to seven years**. Some women deal with them for ***15 years or more***.[1]

When 56 perimenopausal women took **4 mg** of **Siberian rhubarb extract** daily for three months, the median number of hot flashes dropped from **12** to just ***two*** per day. That's an astonishing **83% reduction**.[12]

The **placebo** group had a median **8%** *increase* in the number of hot flashes.[12]

That means Siberian rhubarb performed *better* than **conventional hormone replacement therapy**, which decreases the frequency of hot flashes by about **75%**.[16]

Easing Heart Discomfort

Hot flashes are more than just a nuisance. They are linked with an increased risk of **atherosclerosis** (the buildup of plaque in arteries) and **cardiovascular disease**.[17,18]

Hot flashes are also associated with **inflammation** and poor function of **endothelial cells**, which line blood vessels and promote proper expansion and blood flow.[18]

In addition, falling **estrogen** levels appear to be associated with the heart **palpitations** experienced by many during menopause.[19-21]

In vitro research indicates that the **rhaponticin** in Siberian rhubarb extract has **anti-inflammatory** properties. It may inhibit *enzymes* that produce inflammatory cytokines in endothelial cells.[22]

In placebo-controlled studies, **Siberian rhubarb extract** reduced heart complaints by as much as **60%**, on average, in about three months.[3,12]

Improving Sleep

Sleep problems, including difficulty falling asleep or staying asleep, tend to peak around the final transition to menopause.[23,24]

Several menopause-related factors can contribute to sleep issues, including hormonal changes, hot flashes, and night sweats.[24]

Clinical studies have shown that taking **Siberian rhubarb extract** daily decreases the severity of sleep problems by **60%-69%** in perimenopausal women.[3,12]

A review was done of 17 placebo-controlled trials that tested **botanical** products for the relief of menopause symptoms. **Siberian rhubarb extract** was one of the few remedies that improved sleep.[14]

Relief for Mood Disturbances

Shifting hormone levels during perimenopause are associated with a variety of mood disorders, including **depression**, **irritability**, and **anxiety**.[21,25-27]

In a placebo-controlled trial in 109 perimenopausal women,[26] the majority initially reported feelings of **depression**, including being "in low spirits mostly" or "up and down in spirits a lot."

After taking **Siberian rhubarb** daily for three months, **59%** of the women reported being "in good spirits mostly," and **9%** reported being "in very good spirits mostly."[26]

In the same study, the women taking Siberian rhubarb had a **66%** decline in **anxiety** scores on a recognized anxiety scale.

Research suggests **irritability** is the main mood challenge for women during perimenopause.[25]

In an open-label observational study lasting six months, women who took **4 mg** of Siberian rhubarb extract daily had large reductions in feelings of **irritability**.[13]

Siberian rhubarb may improve mood in several ways.

Both **estrogen** and **progesterone** have mood-improving properties. Their protective effects wane in menopause as hormone levels drop.[26,27]

Animal research suggests that **ER-beta** receptors play a role in mediating anxiety.[26] **Siberian rhubarb extract** may help by activating the **ER-beta** receptors.[26]

In addition, decreasing hot flashes and improving sleep can help improve mood as a side benefit.[24,28]

No More Exhaustion

Roughly **72%-84%** of menopausal women experience **physical** and **mental exhaustion**.[29,30]

These feelings are accompanied by a general decrease in physical and mental performance and concentration, as well as impaired memory, a decrease in concentration, and an increase in forgetfulness.[20]

When perimenopausal women took **Siberian rhubarb extract**, they had an average **57%** improvement in physical and mental exhaustion after *just three months*.[3]

After taking Siberian rhubarb daily for a year, their feelings of exhaustion had improved by an average ***73%***. This level of improvement was maintained for a second year of follow-up.[3]

Siberian rhubarb may achieve these results by interacting with **ER-beta receptors** in the brain, which are involved in memory and cognition.[31]

Countering Urogenital Changes

More than **50%** of postmenopausal women are affected by urogenital symptoms.[32]

These include:[20]

- **Bladder problems** (such as difficulty urinating, increased need to urinate, and incontinence),
- **Vaginal dryness** (which may lead to difficult or painful sex), and
- **Sexual problems** (including a change in sexual desire, activity, or satisfaction).

Perimenopausal women who took **Siberian rhubarb extract** daily for *three months* had a **50%-67%** reduction in severity of urogenital, sexual, and vaginal dryness symptoms, compared to baseline.[3]

Reducing Joint and Muscle Discomfort

Joint pain is more common among postmenopausal women than in men of the same age.[33]

When a group of 427 women aged 40-59 completed the Menopause Rating Scale, joint and muscle discomfort was one of the symptoms *commonly* rated as "**very severe**."[5]

The changes in reproductive hormones that accompany menopause are thought to play a role in the development of **osteoarthritis**, when the cartilage that cushions and protects the ends of the bones wears down.[21]

In placebo-controlled studies of perimenopausal women, taking **4 mg** of **Siberian rhubarb extract** daily for three months resulted in a **46%-50%** improvement in joint and muscle discomfort.[3,12]

Extensive Safety Data

In Germany, **6.7 million doses** of Siberian rhubarb extract are sold *annually*. Scientists have reviewed safety data collected there over two decades and concluded the extract is **safe**.[7]

Four human studies lasting up to two years found **no relevant safety concerns** (such as changes in breast or endometrial tissues) when women took **4 mg** of Siberian rhubarb extract daily.[3,11-13]

In addition, exposing both estrogen-sensitive and estrogen-insensitive breast cancer cell lines to **Siberian rhubarb extract** at a range of concentrations in the lab did *not* promote the proliferation of cancer cells.[34]

Toxicity research in animals found no uterus-stimulating effects or other signs of harm, even when Siberian rhubarb extract was given for three months, in a daily dose approximately ***14,000 times higher*** than the typical human dosage equivalent.[35]

Siberian rhubarb extract has been shown to be a safe, effective way to treat a range of symptoms associated with menopause.

Summary

Most women approaching or going through **menopause** suffer from symptoms like hot flashes, sleep disturbances, and mood changes.

Siberian rhubarb extract has been shown to be a clinically effective, safe, and convenient non-hormonal option for both perimenopausal and postmenopausal women.

Multiple human studies show that **4 mg** of Siberian rhubarb extract taken daily significantly improves all top **11 menopausal symptoms**, including hot flashes, sleep problems, depression and irritability, heart and joint discomfort, sexual problems, and vaginal dryness. •

Not All Extracts Are the Same

Based on studies presented, women who decide on a non-hormonal approach to menopausal symptoms should consider extracts of a *clinically studied form of* Siberian Rhubarb standardized to more than **54% rhaponticin** and more than **27% desoxyrhaponticin**.

References

1. Johnson A, Roberts L, Elkins G. Complementary and Alternative Medicine for Menopause. *J Evid Based Integr Med*. 2019 Jan-Dec;24:2515690X19829380.
2. Zangger M, Poethig D, Meissner F, et al. Linking the menopause rating scale to the International classification of functioning, disability and health - A first step towards the implementation of the EMAS menopause health care model. *Maturitas*. 2018 Dec;118:15-9.
3. Hasper I, Ventskovskiy BM, Rettenberger R, et al. Long-term efficacy and safety of the special extract ERr 731 of Rheum rhaponticum in perimenopausal women with menopausal symptoms. *Menopause.* 2009 Jan-Feb;16(1):117-31.
4. Marlatt KL, Beyl RA, Redman LM. A qualitative assessment of health behaviors and experiences during menopause: A cross-sectional, observational study. *Maturitas.* 2018 Oct;116:36-42.
5. Blumel JE, Arteaga E, Parra J, et al. Decision-making for the treatment of climacteric symptoms using the Menopause Rating Scale. *Maturitas.* 2018 May;111:15-9.
6. Nonhormonal management of menopause-associated vasomotor symptoms: 2015 position statement of The North American Menopause Society. *Menopause*. 2015 Nov;22(11):1155-72; quiz 73-4.
7. Chang JL, Montalto MB, Heger PW, et al. Rheum rhaponticum Extract (ERr 731): Postmarketing Data on Safety Surveillance and Consumer Complaints. *Integr Med (Encinitas)*. 2016 Jun;15(3):34-9.
8. Wober J, Moller F, Richter T, et al. Activation of estrogen receptor-beta by a special extract of Rheum rhaponticum (ERr 731), its aglycones and structurally related compounds. *J Steroid Biochem Mol Biol*. 2007 Nov-Dec;107(3-5):191-201.
9. Farzaneh S, Zarghi A. Estrogen Receptor Ligands: A Review (2013-2015). *Sci Pharm*. 2016 Apr 13;84(3):409-27.
10. Wilson M, Konda V, Heidt K, et al. Rheum rhaponticum Root Extract Improves Vasomotor Menopausal Symptoms and Estrogen-Regulated Targets in Ovariectomized Rat Model. *Int J Mol Sci.* 2021 Jan 21;22(3).
11. Heger M, Ventskovskiy BM, Borzenko I, et al. Efficacy and safety of a special extract of Rheum rhaponticum (ERr 731) in perimenopausal women with climacteric complaints: a 12-week randomized, double-blind, placebo-controlled trial. *Menopause*. 2006 Sep-Oct;13(5):744-59.
12. Kaszkin-Bettag M, Ventskovskiy BM, Solskyy S, et al. Confirmation of the efficacy of ERr 731 in perimenopausal women with menopausal symptoms. *Altern Ther Health Med.* 2009 Jan-Feb;15(1):24-34.
13. Kaszkin-Bettag M, Beck S, Richardson A, et al. Efficacy of the special extract ERr 731 from rhapontic rhubarb for menopausal complaints: a 6-month open observational study. *Altern Ther Health Med.* 2008 Nov-Dec;14(6):32-8.
14. Ismail R, Taylor-Swanson L, Thomas A, et al. Effects of herbal preparations on symptom clusters during the menopausal transition. *Climacteric.* 2015 Feb;18(1):11-28.
15. Santoro N. Perimenopause: From Research to Practice. J *Womens Health (Larchmt)*. 2016 Apr;25(4):332-9.
16. Hayes LP, Carroll DG, Kelley KW. Use of gabapentin for the management of natural or surgical menopausal hot flashes. *Ann Pharmacother.* 2011 Mar;45(3):388-94.
17. Stuenkel CA. Managing menopausal vasomotor symptoms in older women. *Maturitas.* 2021 Jan;143:36-40.
18. Thurston RC, Aslanidou Vlachos HE, Derby CA, et al. Menopausal Vasomotor Symptoms and Risk of Incident Cardiovascular Disease Events in SWAN. *J Am Heart Assoc.* 2021 Feb 2;10(3):e017416.
19. Carpenter JS, Sheng Y, Elomba CD, et al. A Systematic Review of Palpitations Prevalence by Menopausal Status. *Current Obstetrics and Gynecology Reports.* 2021 2021/03/01;10(1):7-13.
20. Khatoon A, Husain S, Husain S, et al. An Overview of Menopausal Symptoms Using the Menopause Rating Scale in a Tertiary Care Center. *J Midlife Health*. 2018 Jul-Sep;9(3):150-4.
21. van Dijk GM, Kavousi M, Troup J, et al. Health issues for menopausal women: the top 11 conditions have common solutions. *Maturitas.* 2015 Jan;80(1):24-30.
22. Kolodziejczyk-Czepas J, Czepas J. Rhaponticin as an anti-inflammatory component of rhubarb: a minireview of the current state of the art and prospects for future research. *Phytochemistry Reviews.* 2019;18(5):1375-86.
23. Al-Safi ZA, Santoro N. Menopausal hormone therapy and menopausal symptoms. *Fertil Steril.* 2014 Apr;101(4):905-15.
24. Proserpio P, Marra S, Campana C, et al. Insomnia and menopause: a narrative review on mechanisms and treatments. *Climacteric*. 2020 Dec;23(6):539-49.
25. Born L, Koren G, Lin E, et al. A new, female-specific irritability rating scale. *J Psychiatry Neurosci*. 2008 Jul;33(4):344-54.
26. Kaszkin-Bettag M, Ventskovskiy BM, Kravchenko A, et al. The special extract ERr 731 of the roots of Rheum rhaponticum decreases anxiety and improves health state and general well-being in perimenopausal women. *Menopause.* 2007 Mar-Apr;14(2):270-83.
27. Lee J, Han Y, Cho HH, et al. Sleep Disorders and Menopause. *J Menopausal Med.* 2019 Aug;25(2):83-7.
28. Stute P, Spyropoulou A, Karageorgiou V, et al. Management of depressive symptoms in peri- and postmenopausal women: EMAS position statement. *Maturitas.* 2020 Jan;131:91-101.
29. Chedraui P, Perez-Lopez FR, Hidalgo L, et al. Evaluation of the presence and severity of menopausal symptoms among postmenopausal women screened for the metabolic syndrome. *Gynecol Endocrinol.* 2014;30(12):918-24.
30. Kulkarni P, Savitha Rani BB, Kumar DS, et al. Burgeoning menopausal symptoms: An urgent public health concern. *J Midlife Health.* 2016 Apr-Jun;7(2):83-7.
31. Gava G, Orsili I, Alvisi S, et al. Cognition, Mood and Sleep in Menopausal Transition: The Role of Menopause Hormone Therapy. *Medicina (Kaunas)*. 2019 Oct 1;55(10).
32. Gandhi J, Chen A, Dagur G, et al. Genitourinary syndrome of menopause: an overview of clinical manifestations, pathophysiology, etiology, evaluation, and management. *Am J Obstet Gynecol*. 2016 Dec;215(6):704-11.
33. Available at: https://www.arthritis-health.com/blog/why-are-women-more-prone-osteoarthritis. Accessed June 24, 2021.
34. Grundemann C, Hertrampf A, Sauer B, et al. Influence of Rheum rhaponticum, Cimicifuga racemosa and Trifolium pratense extracts on breast cancer cell proliferation. *Zeitschrift fur Phytotherapie*. 2015;36:157-63.
35. Kaszkin-Bettag M, Richardson A, Rettenberger R, et al. Long-term toxicity studies in dogs support the safety of the special extract ERr 731 from the roots of Rheum rhaponticum. *Food Chem Toxicol.* 2008 May;46(5):1608-18.

YOUR BONE HEALTH ... NOW **BOOSTED**

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

Item #01727

120 capsules

This product is available at fine health food stores everywhere.

GLUTEN FREE

NON GMO LE CERTIFIED

Discovered in New Zealand yogurt, this novel **probiotic** formula contains **17.2 billion CFU** of ***Bifidobacterium lactis* HN019**.

This probiotic has been **clinically studied** to help maintain a healthy **colonic transit time, relieve occasional constipation,** and **support bowel regularity**.[1]

One capsule daily of this new **FLORASSIST® Daily Bowel Regularity** formula can help promote healthy, daily movement through the **colon**.

This product is available at fine health food stores everywhere.

FLORASSIST® Daily Bowel Regularity

Item #02421

30 vegetarian capsules

GLUTEN FREE

1 DAILY

NON GMO

† Colony Forming Units at time of manufacture.

1. *Scand J Gastroenterol.* 2011;46:1057-64.

ESTROGEN FREE

COMPREHENSIVE menopause *relief*

Menopause 731™ contains **ERr 731®**, a proprietary extract of **Siberian rhubarb**.

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

- **Hot flashes**
- **Night sweats**
- **Irritability**
- **Sleep disturbances**
- **Exhaustion**
- **Sexual function**
- **Joint discomfort**
- **Urinary health**
- **Vaginal dryness**

Item #02204

30 enteric-coated vegetarian tablets

This product is available at fine health food stores everywhere.

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

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

The Hidden Cause of the Autoimmune Pandemic and How to Get Healthy Again

BY DR. STEVEN PHILLIPS AND DANA PARISH

A pandemic of **autoimmune** and **chronic illness** is sweeping the globe, with **50 million** people diagnosed in America alone.

In their new book, Dr. Steven Phillips and his former patient, SONY/ATV singer-songwriter Dana Parish, argue that the true cause of autoimmune disease is **chronic, undiagnosed infections**.

These infections—from Lyme to toxoplasmosis—are caused by a broad range of microbes and lack a simple fix.

In the absence of medical consensus, Dr. Phillips has created innovative treatment strategies to combat these infections. These include using a technique called "pulsing"—along with natural compounds like **oil of oregano, grapefruit seed extract** and **probiotics**.

Both Dr. Phillips and Parish nearly died of undiagnosed infections, and now they are on a mission to help prevent others from having the same experience.

In this interview with ***Life Extension***®, Dr. Phillips and Parish delve deeper into this surprising connection—and Dr. Phillips shares some of his techniques for effectively treating these insidious infections.

—LAURIE MATHENA

LE: What is the connection between infections and autoimmune diseases?

Dr. Phillips: It's striking to us that chronic autoimmune diseases are considered to be of unknown origin, yet so many have been linked in medical literature to infections, specifically Lyme and *Bartonella*.

When people receive a diagnosis of fibromyalgia, MS, lupus, rheumatoid arthritis, Sjogren's, psoriatic arthritis, or another rheumatologic/inflammatory diagnosis, they are not getting an actual diagnosis, but rather a description of signs and symptoms that brings them no closer to an answer.

According to a survey of over 4,000 chronic Lyme patients, roughly **20%** were initially misdiagnosed with one of the following serious neurologic diseases: MS, Parkinson's, ALS, or Multiple Systems Atrophy.

Many doctors are not properly (and sometimes not at all!) evaluating these patients for the possibility of infections and it's disgraceful.

LE: What exactly is Lyme?

Dr. Phillips: To say Lyme is a "tick-borne illness" overly simplifies the matter. The word "Lyme" has come to refer to a family of infections, referred to here as "Lyme+"—and the transmission of these germs is not just by ticks. [Some of these bacteria] can be transmitted by other bugs like fleas, lice, sand flies, spiders, and ants.

LE: What are some examples of conditions often linked to—and caused by—infections associated with Lyme+?

Dr. Phillips:

- Fibromyalgia
- Chronic fatigue syndrome
- Multiple sclerosis
- Rheumatoid arthritis
- Spondyloarthropathy—psoriatic arthritis, spondylitis
- Psoriasis
- Lupus
- Mixed connective tissue disease
- Migraines
- Inflammatory bowel disease, i.e., Crohn's and ulcerative colitis
- Irritable Bowel Syndrome (IBS)
- Interstitial cystitis, bladder symptoms
- Psychiatric illness (e.g., depression, anxiety, OCD, bipolar disorder, and psychosis)
- Dilated cardiomyopathy
- Neurodegenerative diseases including ALS (Lou Gehrig's disease), Alzheimer's disease, Parkinson's disease, and Lewy body disease

LE: That's a shocking list. How could Lyme be mistaken for something like multiple sclerosis?

Dr. Phillips: Lyme can be clinically indistinguishable from multiple sclerosis, a fact that has been documented for decades.

Before the 1950s, spirochetes were visualized in the brains of MS patients and found from their spinal fluid. As documented in the *Official Journal of the California Medical Association* by a group of Stanford-based researchers, they named these organisms *Spirochaeta myelophthora*.

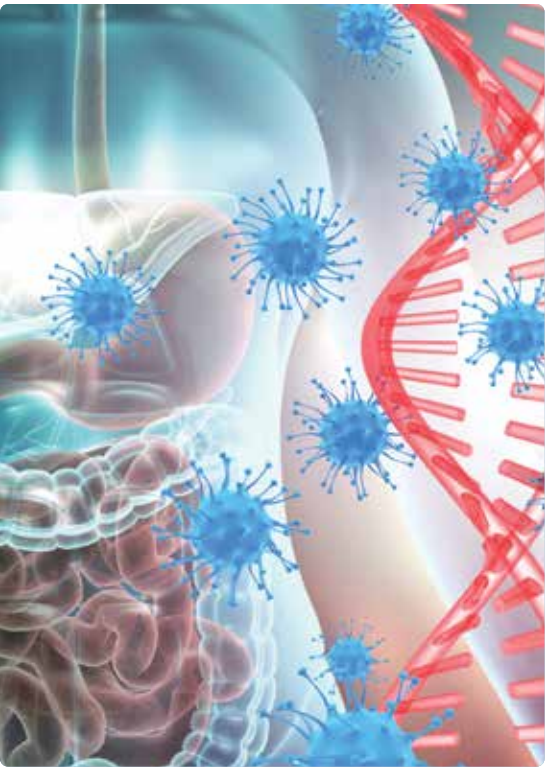
After that, a series of inoculation studies demonstrated that the tissue from the central nervous system of MS patients could be contagious. When lab animals were injected with this tissue, they became infected—their immune systems became inflamed and neurologic illness followed, sometimes resulting in paralysis and death.

In a 2001 study done in Norway, when researchers looked for infectious agents in the cerebrospinal fluid of MS patients, they found *B. burgdorferi* cysts in all of them, but not in healthy controls, with the exception of one, who had a prior history of Lyme.

LE: Is it true that rheumatoid arthritis was originally believed to be caused by an infection?

Dr. Phillips: Retroviruses, parvovirus B19, rubella, Epstein-Barr, and other herpes viruses have all been studied as potential causes of RA.

But the development of the steroid drug cortisone in the late 1940s, which had such an immediate suppressive effect, temporarily covering up painful inflammatory



symptoms, led to a new assumption: that rheumatic disease was autoimmune and tended to run in families.

By the time the side effects and dependency created by the overuse of cortisone became evident and its promise of a "cure" was dispelled, a new medical paradigm and approach to treatment had become firmly established: treat the symptoms, stop looking for a cause, never find a cure.

There have been about a dozen randomized controlled trials comparing antibiotics to placebo, demonstrating benefits from antibiotics but not placebo in RA patients. And some of these studies used antibiotics that were devoid of anti-inflammatory effects.

What's more, studies show benefits from antibiotics in RA patients, over and above the typical drugs prescribed, namely steroids and the chemotherapy drug methotrexate.

LE: How can invading germs flip the "switch" on the body's immune system and cause what are commonly described as autoimmune disorders?

Dr. Phillips: The immune response produced against these infections can also attack normal cells because the invaders are tricky.

They're coated with proteins that look very similar to our own, such as tissue found in our nervous system. When the immune system rallies to attack the bacteria, it can mistakenly attack nerve tissue as well, causing secondary autoimmunity.

LE: Standard, short-term antibiotic treatments are often ineffective. How do you utilize a technique called pulsing to treat Lyme+?

Dr. Phillips: Pulsing means going off and on antibiotics in a predetermined manner, rather than taking them continuously day after day for months on end. For example, a patient would go on an antibiotic protocol for two weeks, then pause for two weeks before repeating it.

Although it may sound counterintuitive and go against what many doctors have been taught about the treatment of bacterial infections—due to the concern of antibiotic resistance—there's robust data published in the journal *Nature* in 2018 that a well-designed pulsed antibiotic regimen can actually reduce the emergence of antibiotic resistance compared to continuous antibiotic therapy.

For Lyme, pulsed antimicrobial therapy can often kill those stubborn persisters more effectively. Laboratory studies in test tubes with *B. burgdorferi* demonstrate that one application of the antibiotic ceftriaxone, for instance, does not eliminate persisters—the intransigent forms of the organism that put the "chronic" in chronic Lyme—but that pulsed therapy with ceftriaxone can.

LE: Are you concerned about the damage that antibiotics can cause to the gut microbiota?

Dr. Phillips: Although I have designed my regimens to focus on fewer antibiotics and more non-antibiotic antimicrobials, antibiotics are usually a necessary component—and all of them can disrupt gut flora to varying degrees.

Not all antibiotics are created equal in this regard. Some are far easier on the gut flora, and these are the ones I use.

I recommend that my patients take an oral probiotic supplement that contains at least 10 billion colony-forming units (CFU) with any antibiotic regimen, taken at least two hours apart from the antibiotics, but with food.

LE: In addition to antibiotics, what else is included in your treatment protocol?

Dr. Phillips: Studies have shown that combinations of antimicrobials against *B. burgdorferi* persisters can be helpful, and it's well known that combinations of effective antibiotics work better than single agents against *Brucella* and *Bartonella*.

The options for a second drug are usually liposomal oil of oregano, monolaurin, fluconazole, or azithromycin.

LE: Can you tell us more about oregano and monolaurin?

Dr. Phillips: Oil of oregano is an herbal antimicrobial that is known to have powerful activity against *B. burgdorferi*, as well as its biofilm, which is a viscous substance formed by colonies of bacteria. The biofilm helps bacteria to survive antibiotics and the assault from the immune system.

Oil of oregano has activity against *Bartonella* in the test tube as well, and I've seen it work many times in *Bartonella* patients.

Monolaurin is a naturally occurring substance in breast milk with broad-range antimicrobial activity against a spectrum of bacteria, including Lyme bacteria, as well as viruses and even parasites. Although no studies of its activity against *Bartonella* have yet been published, I've seen it work in *Bartonella* patients many times.

In my office, we use a preparation that comes in granules; the maximum dose is **3,000 mg** three times daily.

LE: Have other natural solutions been found to be effective?

Dr. Phillips: Herbals that have been shown to be effective in vitro against the Lyme bacteria include grapefruit seed extract, samento, and artemisinin, along with oil of oregano, cinnamon bark oil, clove bud oil, citronella oil, and wintergreen oil.

A 2017 study conducted by researchers from major universities, including Harvard and Johns Hopkins, showed some essential oils killed Lyme bacteria more effectively than antibiotics.

In particular, oils from oregano, garlic cloves, myrrh trees, thyme leaves, cinnamon bark, allspice berries, and cumin seeds were shown to have strong killing activity against the stubborn "persister" forms that most antibiotics can't kill.

Bear in mind that since some of these may be stronger than antibiotics, it would not be advisable to add any into your MD-prescribed protocol on your own. Please, always ask your doctor first.

LE: What action can a ***Life Extension***® reader take if they suspect possible chronic Lyme?

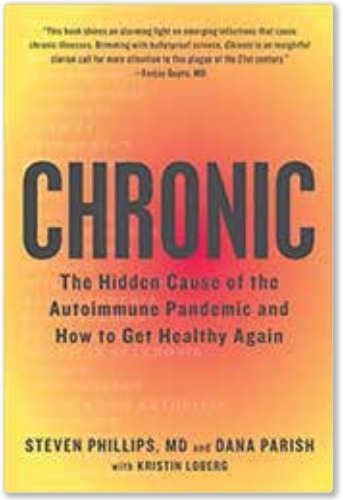
Dr. Phillips: A good first step may be to consult a physician trained by ILADS (International Lyme and Associated Diseases Society). Otherwise, Lyme+ may not be properly evaluated, which can lead to years or decades on the medical merry-go-round.

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

To find a provider, ILADS has a provider search on their website (www.ilads.org).

Steven Phillips, M.D., is a renowned, Yale-trained physician, international lecturer, and media go-to expert. Well-published in the medical literature, he has treated over 20,000 patients with complex, chronic illness from about 20 countries. Phillips experienced firsthand the nightmare of undiagnosed, serious infection after nearly dying from his own "mystery illness," and having to save his own life when 25 doctors could not.

Dana Parish developed Lyme-induced heart failure as a result of being improperly diagnosed by some of the best doctors in the country—and had her life saved by Dr. Phillips. A chart-topping SONY/ATV singer/songwriter who has written songs for artists like Celine Dion and Idina Menzel, she has become a major voice in the world of chronic illness. Her popular column on *Huffington Post* has been read by more than one million people globally.



Restore Youthful Cellular Energy with PQQ

PQQ (*pyrroloquinoline quinone*) activates genes involved in the production of cellular energy.[1-5]

Studies show **PQQ** supports heart health and cognitive function, complementing CoQ10.[6,7]

In fact, just **20 mg** per day of **PQQ** plus **CoQ10** promotes memory and attention in aging individuals.[8]

This formulation contains **20 mg** of **PQQ** per capsule, which is the recommended daily dose.

These products are available at fine health food stores everywhere.

Item #01647

20 mg • 30 vegetarian capsules

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

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

References

1. *Alt Med Rev*. 2009; 14(3):268-77.
2. *J Nutr*. 2006 Feb;136(2):390-6.
3. *Exp Biol Med (Maywood)*. 2003 Feb;228(2):160-6.
4. *Biochim Biophys Acta*. 2006 Nov;1760(11):1741-8.
5. *J Biol Chem*. 2010 Jan 1;285:142-52.
6. *Cardiovasc Drugs Ther*. 2004 Nov;18(6):421-31.
7. *J Cardiovasc Pharmacol Ther*. 2006 Jun;11 (2):119-28.
8. *FOOD Style*. 2009;21:13(7)50-3.

ACTIVATE CELLULAR

Autophagy

Help Your Cells Remove Internal Debris

GEROPROTECT® Autophagy Renew *stimulates* the body's natural **"cellular cleanup"** process essential to youthful cellular function and overall health.

This longevity formula contains **luteolin** and **piperlongumine** to:

- Promote ongoing cellular housekeeping
- Encourage healthy cell debris removal
- Inhibit mTOR signaling

Activating **autophagy** supports healthy cellular function and longevity.

This product is available at fine health food stores everywhere.

Item #02415

30 vegetarian capsules

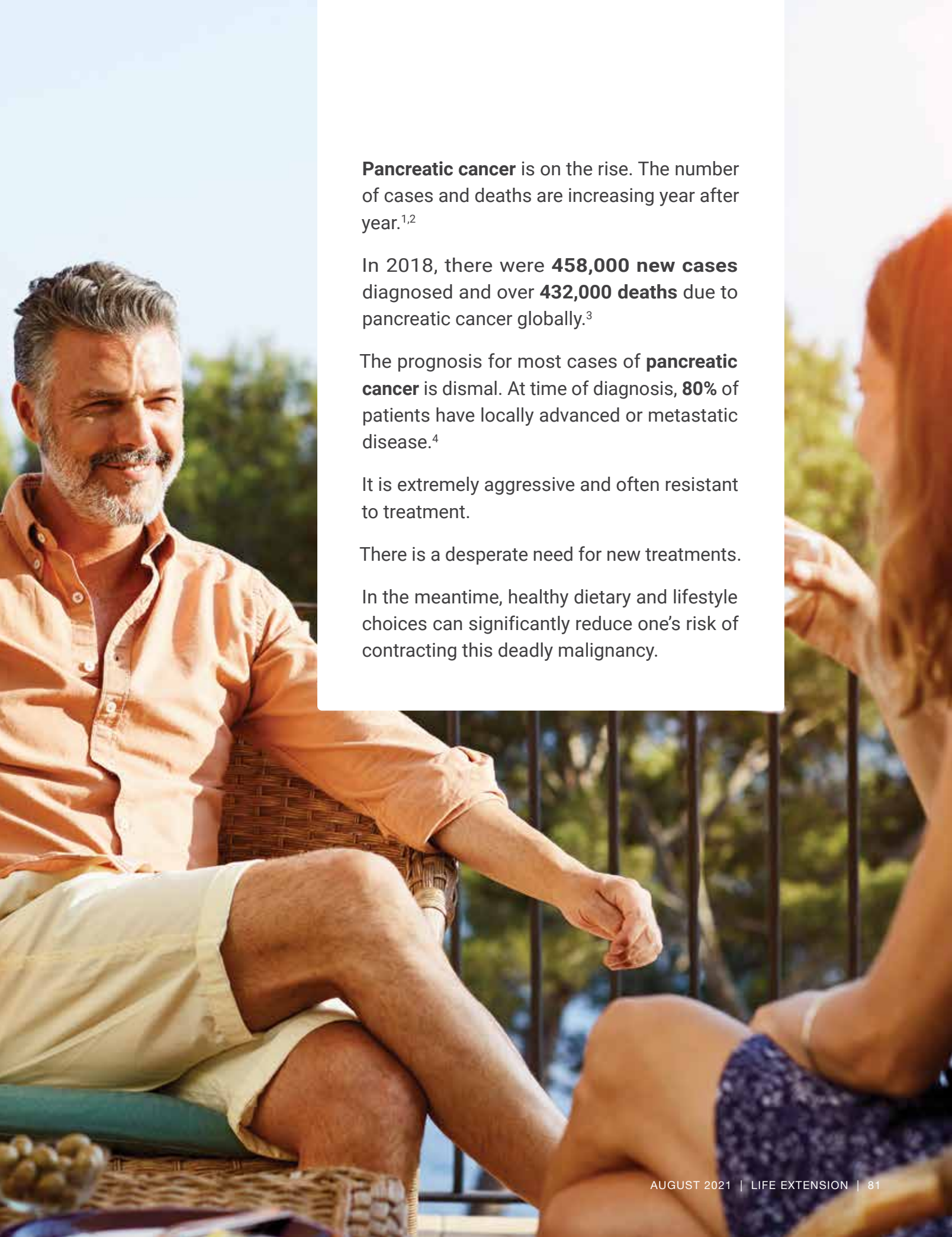
Developed in collaboration with Insilico Medicine, Inc.

GLUTEN FREE

NON GMO LE CERTIFIED

Promising Strategies in the Fight Against **Pancreatic Cancer**

BY DAVID MARCUS



Pancreatic cancer is on the rise. The number of cases and deaths are increasing year after year.[1,2]

In 2018, there were **458,000 new cases** diagnosed and over **432,000 deaths** due to pancreatic cancer globally.[3]

The prognosis for most cases of **pancreatic cancer** is dismal. At time of diagnosis, **80%** of patients have locally advanced or metastatic disease.[4]

It is extremely aggressive and often resistant to treatment.

There is a desperate need for new treatments.

In the meantime, healthy dietary and lifestyle choices can significantly reduce one's risk of contracting this deadly malignancy.

What Is the Pancreas?

The **pancreas** is an organ located in the abdomen, near the stomach and small intestine.

It plays two major roles.

Exocrine tissue in the pancreas produces a liquid that enters the small intestine through **ducts**. This liquid and its *enzymes* aid in **digestion**.

It is from these ducts that most pancreatic cancers arise.

The pancreas also contains **endocrine** tissue. These cells produce hormones, including **insulin**, which are released into the bloodstream and **regulate blood sugar** levels.

Why Pancreatic Cancer Is So Deadly

Pancreatic cancer is only the **11th** most-common cancer in the U.S. But it's the ***third-leading cause of U.S. cancer deaths***.[5]

The overall five-year survival rate for pancreatic cancer is only 1**0%**. Survival depends on how *early* the cancer is caught and treated. When caught early, the five-year survival rate can be close to **40%**.

Unfortunately, more than half of all pancreatic cancers aren't diagnosed until the disease has metastasized. The five-year survival rate for these patients is a frightening **3%**.[2]

There are three main reasons why this form of cancer is so deadly.

First, early pancreatic cancers often do not cause symptoms. That means the tumor can continue growing unnoticed for a long time.

Second, pancreatic cancers are ***aggressive***. They grow rapidly and quickly invade nearby tissues. They also **metastasize**—spread through the bloodstream or lymphatic system—to distant organs or tissues quite easily.

Third, pancreatic cancers are notoriously ***difficult to treat***. Only the earliest, localized tumors can be effectively treated with surgery.[1] In advanced stages, pancreatic cancer tends to be long-term resistant to chemotherapy drugs and radiation.

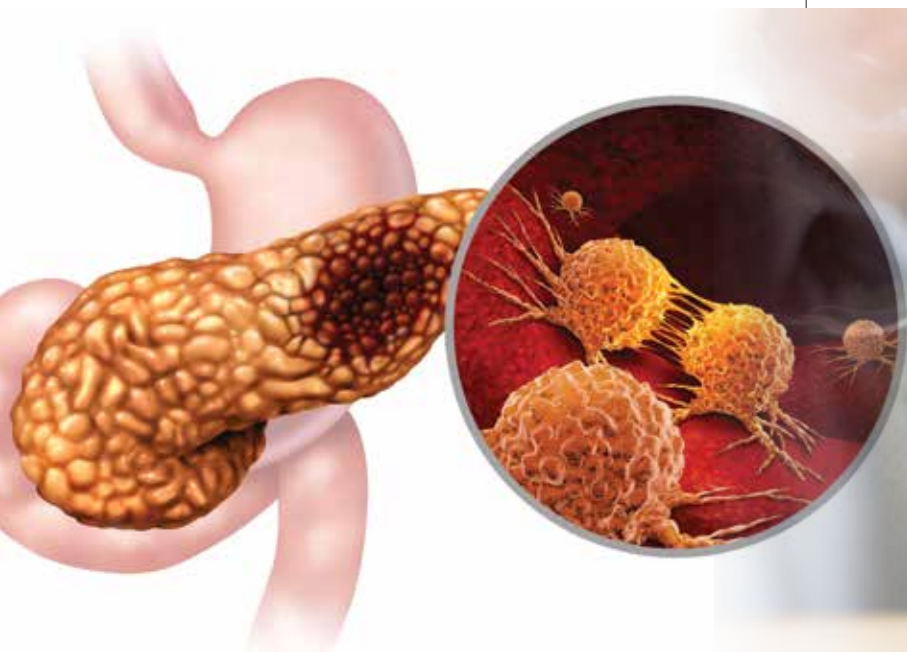
Lowering Risk Factors

There *are* some known ways to lower the risk of developing pancreatic cancer.

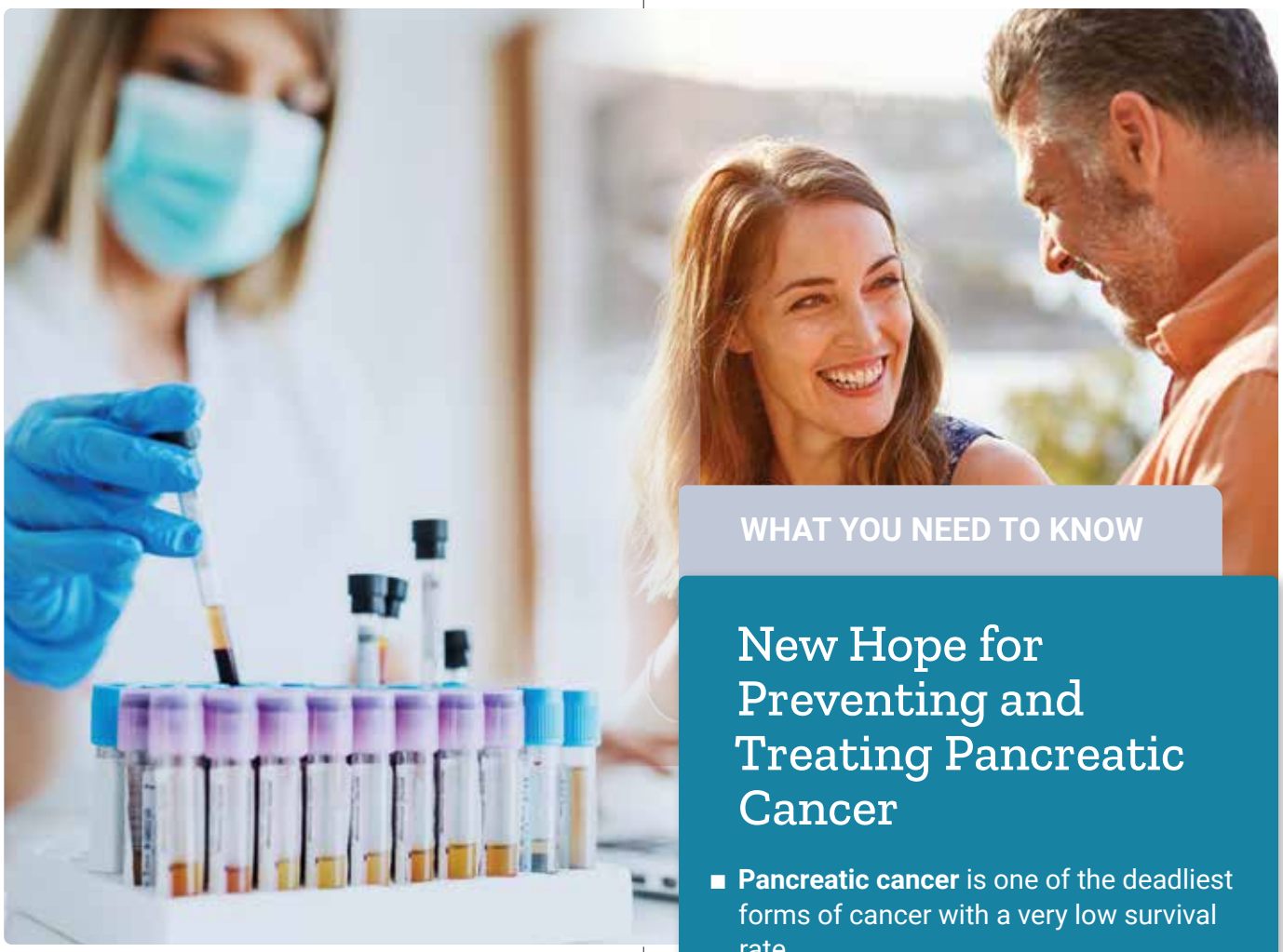
Poor diet, excessive alcohol intake, smoking, obesity, diabetes, and certain nutrient deficiencies have been identified as factors that increase risk for cancers.[1,4,6,7]

For example, compared to never-smokers, pipe smokers have a **1.6-fold** greater risk of developing pancreatic cancer than non-smokers, and cigarette smokers have a **1.5-fold** greater risk of developing pancreatic cancer.[8]

Recent onset of **diabetes** is associated with a **four-to-seven-fold** greater risk of developing it within three years of diagnosis.[9]



PANCREATIC CANCER



Heavy drinking and diets high in animal fats and **saturated fats** also significantly increase the risk of pancreatic cancer.[7]

Quitting smoking, improving diet, losing weight, and controlling blood sugar all help ***lower the risk*** of developing different types of malignancies, including pancreatic cancer.

Inadequate intake of various nutrients commonly found in fruits and vegetables also contributes to cancer risk. Studies show that *high* intake of these foods *reduces* risk of pancreatic cancer.[6]

Protective Nutrients

Several **nutrients** and **vitamins** have indicated protective properties against pancreatic and other cancers.

These are often lacking in standard American diets. **Supplemental intake** of these compounds can correct deficiencies and raise levels to more beneficial amounts.

WHAT YOU NEED TO KNOW

New Hope for Preventing and Treating Pancreatic Cancer

- **Pancreatic cancer** is one of the deadliest forms of cancer with a very low survival rate.
- Cancer of the pancreas is aggressive and highly resistant to standard treatments in most cases.
- Curcumin, omega-3 fatty acids, carotenoids, green tea catechins, and magnesium may reduce the risk of developing pancreatic cancer *and* improve treatment in patients who already have it.
- The diabetes medication **metformin** and cholesterol-lowering **statin** drugs have also shown an ability to reduce the risk of and improve survival in pancreatic cancer. Both are being studied further and may come to be a part of standard treatment.

CAROTENOIDS

The **carotenoids** are a group of nutrients found in fruits and vegetables.

The most studied as it relates to risk reduction are **alpha-carotene**, **beta-carotene**, **lycopene**, **astaxanthin**, **lutein**, and **zeaxanthin**.

Most of the carotenoids, either alone or in combination, have remarkable impact on various aspects of health. Numerous studies have drawn a link between carotenoid intake and prevention of cancer.[10,11]

Cell studies show that some carotenoids reduce pro-inflammatory signaling in cancers and induce cell death by apoptosis.[12]

A number of epidemiological studies have evaluated whether intake of carotenoids impacts risk for pancreatic cancer. Most of the common carotenoids have been shown to be associated with reduced pancreatic cancer risk, including alpha- and beta-carotene, vitamin A, lycopene, lutein, and zeaxanthin.[13-17]

For example, men with the *highest* intake of lycopene were **31%** less likely to develop pancreatic cancer than men with the lowest intake.[17] Beta-carotene and zeaxanthin intakes (highest vs. lowest) have been associated with a reduced risk of **48%** and **47%**, respectively.[16]

Even in existing cancer, carotenoids provide benefits. For instance, in pancreatic cancer cells that have become resistant to chemotherapy, **astaxanthin** blocked the cancer cell progression and increased their sensitivity to chemotherapy, aiding in killing of the cancer cells.[18]

CURCUMIN

Curcumin is the active compound found in the spice **turmeric**. It has been shown to act against cancer by several different mechanisms, affecting cancer cells at multiple points in their development.[19]

Studies in cell cultures and animals demonstrate that curcumin has the ability to inhibit pancreatic cancer growth.[20,21]

It works by stopping the tumor from growing new blood vessels, essentially starving it of nutrients. It also has direct **toxic** effects in cancer cells, killing them while being healthy for normal cells.[20,21]

Curcumin also blocks the ability of cancer cells to migrate and spread, ***preventing metastases*** to other organs.[22]

One of the major hurdles in the treatment of pancreatic cancer is that it develops resistance to **chemotherapy**. The most commonly used chemotherapy drug, **gemcitabine**, often becomes useless after a short time because the tumor stops responding to it.

Curcumin has been shown, in a laboratory study, to ***turn off this resistance***, allowing chemotherapy to have a greater impact.[23]

If future preclinical and clinical studies confirm this result, curcumin could not only help to prevent pancreatic cancer, but also to improve its treatment in patients who do develop this deadly disease.

VITAMIN D

Vitamin D deficiencies are extremely common, especially in older adults. Inadequate levels of vitamin D have been found to be associated with increased risk for several chronic diseases, including cancer.

Research also suggests a positive association between vitamin D intake or status and lower total cancer risk and mortality.[24-26]

One analysis found that higher vitamin D intake (**600 IU**/day or more) was associated with a **41%** lower risk for pancreatic cancer when compared to the lower intake (less than **150 IU/day**).

Exposure to **sunlight**—which helps the body produce vitamin D—is also associated with a reduced risk of pancreatic cancer.[27-29]

GREEN TEA CATECHINS

Green tea and its extracts contain compounds called **catechins** that have numerous health benefits.

In observational studies, *higher* tea consumption is associated with *lower* risk of developing pancreatic cancer.[30-32] In one study in China, regular tea drinkers had a **51%** lower risk of pancreatic cancer compared to people who did not drink tea regularly.[32]

Like curcumin, green tea has direct effects on pancreatic cancer cells. In preclinical studies, it has been shown to reduce tumor cell growth, invasion, and migration, and to cause cancer cells to die off.[33,34]

Also, like curcumin, catechins increase the impact of **chemotherapy** drugs.

EGCG (epigallocatechin gallate) is the most common catechin in green tea. In one preclinical study, it reduced pancreatic cancer growth by **40%** on its own. The chemotherapy drug **gemcitabine** reduced growth by **52%**.

But ***together***, the two compounds ***reduced cancer growth by 67%***.[35] EGCG has shown this ability for other cancer cell types and with other chemotherapy drugs as well.[36]

OMEGA-3 FATTY ACIDS

Omega-3 fatty acids from **fish oil** act by numerous mechanisms to help fight a wide array of cancers.[37-39]

For example, abnormal activation of two key signaling proteins, **STAT3** and **NF-kB**, contribute significantly to the survival and growth of pancreatic cancer cells. Omega-3 fatty acids *suppress* their activity.[40]

In mice, omega-3s prevent the formation and viability of pancreatic cancer, while unhealthy fats *accelerate* tumor formation.[41,42]

In people, greater intake of omega-3 fatty acids, particularly **DHA**, has been associated with reduced risk of pancreatic cancer compared to lower intake.[43 44]

Omega-3s also work with other nutrients and medications.

The *combination* of **omega-3 fatty acids** and the cancer drug **gemcitabine** was found to completely block the secretion of a cancer growth factor called **platelet-derived growth factor** in pancreatic cancer cells.[45]

Combining **omega-3s** and **curcumin** has also been found to enhance the killing of pancreatic cancer cells.[46]

A review of trials that included omega-3 use in humans with advanced, terminal pancreatic cancer found that they helped to maintain body weight and approximately doubled ***patients' survival time***.[47]

MAGNESIUM

Magnesium is a critical mineral required for many different processes in the body, including metabolism. *Low* levels of magnesium contribute to many chronic diseases, particularly cardiovascular disease.[48,49]

There is mounting evidence that suboptimal intake of magnesium contributes to the development of **cancers** as well.

Magnesium is a required cofactor (or "helper molecule") for proteins involved in **DNA repair**.[48]

Without enough magnesium, DNA repair may be inadequate. This leads to more rapid accumulation of genetic mutations, which contribute to the development of cancer.

One large study found a clear association between magnesium intake and risk for pancreatic cancer.[50] The study followed more than **66,000** older adults for eight years.

Subjects were divided into in three groups based upon their magnesium intake as follows:

- **"Optimal" Intake**—These authors defined this as consuming greater than or equal to 100% of the government RDA for magnesium (**420 mg** a day for males and **320 mg** a day for females)
- **Sub-optimal Intake**—Daily intake of **75%** to **99%** of the government RDA for magnesium
- **Deficient Intake**—Less than **75%** of the government RDA for magnesium (less than **315 mg** a day for males and less than **240 mg** a day for females)

Compared to those with what the authors called "optimal intake," subjects with sub-optimal intake had a **42%** greater risk of developing pancreatic cancer. Those with ***deficient*** intake had a striking ***76% greater risk*** of pancreatic cancer compared with those with intakes greater than or equal to **100%** of the magnesium RDA.

Medications with Anti-Pancreatic-Cancer Effects

The standard pharmacologic treatment for existing pancreatic cancer is generally chemotherapy drugs, radiation, or a combination of both. They have little success.

Studies have found that patients who are taking two non-cancer medications, **metformin** or **statin** drugs, have some protection against the development and spread of this deadly cancer.

METFORMIN

Metformin is the most common drug used to control blood glucose levels in **type II diabetes**.

Research shows that metformin use in diabetics is associated with lower risk of developing pancreatic cancer.[51,52]

In a study of records of patients with pancreatic cancer and diabetes treated at the **University of Texas MD Anderson** cancer center, the two-year survival rate in those taking metformin was nearly **twice** that of patients not taking metformin.[53]

A large 2018 meta-analysis included nearly 4,300 diabetic pancreatic cancer patients, over 2,000 of whom had received metformin. This study found metformin use in diabetics with pancreatic cancer was associated with a **19%** reduced overall mortality risk compared to those who did not use metformin.[54]

And in a **2020** meta-analysis, compared to no use, metformin use was associated with overall better survival in patients who underwent surgery for pancreatic cancer.[55]

Human trials evaluating the role of metformin in treating pancreatic cancer are currently underway or recently completed.[56] Depending on the results, metformin may become a more standard component of cancer care.

STATINS

The **statins** are a group of drugs used to lower **cholesterol** levels, reducing risk of cardiovascular disease.

They work by inhibiting an enzyme important for the synthesis of cholesterol in the body.

Researchers have found that use of statin drugs lowers risk for **pancreatic cancer**, increases survival, lowers mortality, and inhibits its growth.[19]

In cell culture and animal models of pancreatic cancer, treatment with statins stunts the growth of cancer cells and prolongs survival of the animals.[19,57]

In one large study of over **12,000** older patients with pancreatic cancer, those who started statins after their diagnosis had a **31%** improved overall survival.[58]

Another study looked at the medical records of almost a ***half million*** veterans.[59] Statin use of six months or longer was associated with a ***67% lower risk*** of developing pancreatic cancer. And statin use for more than four years correlated with a reduction in risk up to **80%**.

Treatments for pancreatic cancer that include statins are currently being evaluated in five registered **clinical trials**.[60]

These medications and the many compounds that have shown anti-cancer properties offer new hope for ways to prevent and treat this lethal cancer.

Summary

Pancreatic cancer is one of the deadliest forms of cancer.

Treatment is rarely successful. But evidence shows that increasing intake of certain nutrients and healthier lifestyles help lower the risk of developing it and slow its growth in patients with the disease.

The best documented nutrients are:

- Carotenoids,
- Curcumin,
- Green tea catechins,
- Omega-3 fatty acids, and
- Magnesium.

In addition, the diabetes drug **metformin** and cholesterol-lowering **statins** have shown benefits in protecting against pancreatic cancer and in extending life in patients with pancreatic cancer. They have been studied in preclinical models, and are being tested in humans. •

References

1. Martinez-Useros J, Li W, Cabeza-Morales M, et al. Oxidative Stress: A New Target for Pancreatic Cancer Prognosis and Treatment. *J Clin Med*. 2017 Mar 9;6(3).
2. Available at: https://www.cancer.net/cancer-types/pancreatic-cancer/statistics. Accessed May 7, 2021.
3. Rawla P, Sunkara T, Gaduputi V. Epidemiology of Pancreatic Cancer: Global Trends, Etiology and Risk Factors. *World J Oncol*. 2019 Feb;10(1):10-27.
4. Zhang Q, Zeng L, Chen Y, et al. Pancreatic Cancer Epidemiology, Detection, and Management. *Gastroenterol Res Pract*. 2016;2016:8962321.
5. Available at: http://seer.cancer.gov/statfacts/html/pancreas.html. Accessed May 14, 2021.
6. Casari I, Falasca M. Diet and Pancreatic Cancer Prevention. *Cancers (Basel).* 2015 Nov 23;7(4):2309-17.
7. Lu PY, Shu L, Shen SS, et al. Dietary Patterns and Pancreatic Cancer Risk: A Meta-Analysis. *Nutrients.* 2017 Jan 5;9(1).
8. Bertuccio P, La Vecchia C, Silverman DT, et al. Cigar and pipe smoking, smokeless tobacco use and pancreatic cancer: an analysis from the International Pancreatic Cancer Case-Control Consortium (PanC4). *Ann Oncol.* 2011 Jun;22(6):1420-6.
9. Magruder JT, Elahi D, Andersen DK. Diabetes and pancreatic cancer: chicken or egg? *Pancreas.* 2011 Apr;40(3):339-51.
10. Rowles JL, 3rd, Erdman JW, Jr. Carotenoids and their role in cancer prevention. *Biochim Biophys Acta Mol Cell Biol Lipids*. 2020 Nov;1865(11):158613.
11. Rumi G, Jr., Matus Z, Toth G, et al. Changes of serum carotenoids in patients with esophageal, gastric, hepatocellular, pancreatic and colorectal cancer. *J Physiol Paris.* 2001 Jan-Dec;95(1-6):239-42.
12. Jeong Y, Lim JW, Kim H. Lycopene Inhibits Reactive Oxygen Species-Mediated NF-kappaB Signaling and Induces Apoptosis in Pancreatic Cancer Cells. *Nutrients.* 2019 Apr 1;11(4).
13. Chen J, Jiang W, Shao L, et al. Association between intake of antioxidants and pancreatic cancer risk: a meta-analysis. *Int J Food Sci Nutr.* 2016 Nov;67(7):744-53.
14. Huang X, Gao Y, Zhi X, et al. Association between vitamin A, retinol and carotenoid intake and pancreatic cancer risk: Evidence from epidemiologic studies. *Sci Rep*. 2016 Dec 12;6:38936.
15. Jansen RJ, Robinson DP, Stolzenberg-Solomon RZ, et al. Nutrients from fruit and vegetable consumption reduce the risk of pancreatic cancer. *J Gastrointest Cancer.* 2013 Jun;44(2):152-61.
16. Jeurnink SM, Ros MM, Leenders M, et al. Plasma carotenoids, vitamin C, retinol and tocopherols levels and pancreatic cancer risk within the European Prospective Investigation into Cancer and Nutrition: a nested case-control study: plasma micronutrients and pancreatic cancer risk. *Int J Cancer.* 2015 Mar 15;136(6):E665-76.
17. Nkondjock A, Ghadirian P, Johnson KC, et al. Dietary intake of lycopene is associated with reduced pancreatic cancer risk. *J Nutr.* 2005 Mar;135(3):592-7.
18. Yan T, Li HY, Wu JS, et al. Astaxanthin inhibits gemcitabine-resistant human pancreatic cancer progression through EMT inhibition and gemcitabine resensitization. *Oncol Lett.* 2017 Nov;14(5):5400-8.
19. Bigelsen S. Evidence-based complementary treatment of pancreatic cancer: a review of adjunct therapies including paricalcitol, hydroxychloroquine, intravenous vitamin C, statins, metformin, curcumin, and aspirin. *Cancer Manag Res.* 2018;10:2003-18.

20. Bimonte S, Barbieri A, Leongito M, et al. Curcumin AntiCancer Studies in Pancreatic Cancer. *Nutrients.* 2016 Jul 16;8(7).
21. Bimonte S, Barbieri A, Palma G, et al. Curcumin inhibits tumor growth and angiogenesis in an orthotopic mouse model of human pancreatic cancer. *Biomed Res Int.* 2013;2013:810423.
22. Wang Q, Qu C, Xie F, et al. Curcumin suppresses epithelial-to-mesenchymal transition and metastasis of pancreatic cancer cells by inhibiting cancer-associated fibroblasts. *Am J Cancer Res*. 2017;7(1):125-33.
23. Yoshida K, Toden S, Ravindranathan P, et al. Curcumin sensitizes pancreatic cancer cells to gemcitabine by attenuating PRC2 subunit EZH2, and the lncRNA PVT1 expression. *Carcinogenesis*. 2017 Oct 1;38(10):1036-46.
24. Skinner HG, Michaud DS, Giovannucci E, et al. Vitamin D intake and the risk for pancreatic cancer in two cohort studies. *Cancer Epidemiol Biomarkers Prev.* 2006 Sep;15(9):1688-95.
25. Bao Y, Ng K, Wolpin BM, et al. Predicted vitamin D status and pancreatic cancer risk in two prospective cohort studies. *Br J Cancer.* 2010 Apr 27;102(9):1422-7.
26. Giovannucci E, Liu Y, Rimm EB, et al. Prospective study of predictors of vitamin D status and cancer incidence and mortality in men. J *Natl Cancer Inst.* 2006 Apr 5;98(7):451-9.
27. Altieri B, Grant WB, Della Casa S, et al. Vitamin D and pancreas: The role of sunshine vitamin in the pathogenesis of diabetes mellitus and pancreatic cancer. *Crit Rev Food Sci Nutr.* 2017 Nov 2;57(16):3472-88.
28. Iqbal S, Naseem I. Pancreatic cancer control: is vitamin D the answer? *Eur J Cancer Prev.* 2016 May;25(3):188-95.
29. Tran B, Whiteman DC, Webb PM, et al. Association between ultraviolet radiation, skin sun sensitivity and risk of pancreatic cancer. *Cancer Epidemiol.* 2013 Dec;37(6):886-92.
30. Chen K, Zhang Q, Peng M, et al. Relationship between tea consumption and pancreatic cancer risk: a meta-analysis based on prospective cohort studies and case-control studies. *Eur J Cancer Prev.* 2014 Sep;23(5):353-60.
31. Wang J, Zhang W, Sun L, et al. Green tea drinking and risk of pancreatic cancer: a large-scale, population-based case-control study in urban Shanghai. *Cancer Epidemiol.* 2012 Dec;36(6):e354-8.
32. Zheng Z, Zheng R, He Y, et al. Risk Factors for Pancreatic Cancer in China: A Multicenter Case-Control Study. *J Epidemiol.* 2016;26(2):64-70.
33. Bimonte S, Cascella M, Leongito M, et al. An overview of preclinical studies on the effects of (-)-epigallocatechin-3-gallate, a catechin found in green tea, in treatment of pancreatic cancer. *Recenti Prog Med.* 2017 Jun;108(6):282-7.
34. Wei R, Penso NEC, Hackman RM, et al. Epigallocatechin-3-Gallate (EGCG) Suppresses Pancreatic Cancer Cell Growth, Invasion, and Migration partly through the Inhibition of Akt Pathway and Epithelial-Mesenchymal Transition: Enhanced Efficacy when Combined with Gemcitabine. *Nutrients.* 2019 Aug 9;11(8).
35. Wei R, Hackman RM, Wang Y, et al. Targeting Glycolysis with Epigallocatechin-3-Gallate Enhances the Efficacy of Chemotherapeutics in Pancreatic Cancer Cells and Xenografts. *Cancers (Basel).* 2019 Oct 5;11(10).
36. Wei R, Wirkus J, Yang Z, et al. EGCG sensitizes chemotherapeutic-induced cytotoxicity by targeting the ERK pathway in multiple cancer cell lines. *Arch Biochem Biophys.* 2020 Oct 15;692:108546.
37. Nabavi SF, Bilotto S, Russo GL, et al. Omega-3 polyunsaturated fatty acids and cancer: lessons learned from clinical trials. *Cancer Metastasis Rev.* 2015 Sep;34(3):359-80.
38. Park M, Kim H. Anti-cancer Mechanism of Docosahexaenoic Acid in Pancreatic Carcinogenesis: A Mini-review. *J Cancer Prev.* 2017 Mar;22(1):1-5.
39. Torres C, Diaz AM, Principe DR, et al. The Complexity of Omega-3 Fatty Acid Modulation of Signaling Pathways Related to Pancreatic Cancer. *Curr Med Chem.* 2018;25(22):2608-23.
40. Park M, Lim JW, Kim H. Docoxahexaenoic Acid Induces Apoptosis of Pancreatic Cancer Cells by Suppressing Activation of STAT3 and NF-kappaB. *Nutrients.* 2018 Nov 2;10(11).
41. Ding Y, Mullapudi B, Torres C, et al. Omega-3 Fatty Acids Prevent Early Pancreatic Carcinogenesis via Repression of the AKT Pathway. *Nutrients.* 2018 Sep 12;10(9).
42. Yu M, Liu H, Duan Y, et al. Four types of fatty acids exert differential impact on pancreatic cancer growth. *Cancer Lett.* 2015 May 1;360(2):187-94.
43. He K, Xun P, Brasky TM, et al. Types of fish consumed and fish preparation methods in relation to pancreatic cancer incidence: the VITAL Cohort Study. *Am J Epidemiol.* 2013 Jan 15;177(2): 152-60.
44. Hidaka A, Shimazu T, Sawada N, et al. Fish, n-3 PUFA consumption, and pancreatic cancer risk in Japanese: a large, population-based, prospective cohort study. *Am J Clin Nutr.* 2015 Dec;102(6):1490-7.
45. Haqq J, Howells LM, Garcea G, et al. Targeting pancreatic cancer using a combination of gemcitabine with the omega-3 polyunsaturated fatty acid emulsion, Lipidem. *Mol Nutr Food Res*. 2016 Jun;60(6):1437-47.
46. Fiala M. Curcumin and omega-3 fatty acids enhance NK cell-induced apoptosis of pancreatic cancer cells but curcumin inhibits interferon-gamma production: benefits of omega-3 with curcumin against cancer. *Molecules*. 2015 Feb 12;20(2):3020-6.
47. Ma YJ, Yu J, Xiao J, et al. The consumption of omega-3 polyunsaturated fatty acids improves clinical outcomes and prognosis in pancreatic cancer patients: a systematic evaluation. *Nutr Cancer*. 2015;67(1):112-8.
48. Blaszczyk U, Duda-Chodak A. Magnesium: its role in nutrition and carcinogenesis. *Rocz Panstw Zakl Hig.* 2013;64(3):165-71.
49. Kostov K, Halacheva L. Role of Magnesium Deficiency in Promoting Atherosclerosis, Endothelial Dysfunction, and Arterial Stiffening as Risk Factors for Hypertension. *Int J Mol Sci.* 2018 Jun 11;19(6).
50. Dibaba D, Xun P, Yokota K, et al. Magnesium intake and incidence of pancreatic cancer: the VITamins and Lifestyle study. *Br J Cancer*. 2015 Dec 1;113(11):1615-21.
51. Currie CJ, Poole CD, Gale EA. The influence of glucose-lowering therapies on cancer risk in type 2 diabetes. *Diabetologia.* 2009 Sep;52(9):1766-77.
52. Lee MS, Hsu CC, Wahlqvist ML, et al. Type 2 diabetes increases and metformin reduces total, colorectal, liver and pancreatic cancer incidences in Taiwanese: a representative population prospective cohort study of 800,000 individuals. *BMC Cancer.* 2011 Jan 18;11:20.
53. Sadeghi N, Abbruzzese JL, Yeung SC, et al. Metformin use is associated with better survival of diabetic patients with pancreatic cancer. *Clin Cancer Res*. 2012 May 15;18(10):2905-12.
54. Xin W, Fang L, Fang Q, et al. Effects of metformin on survival outcomes of pancreatic cancer patients with diabetes: A meta-analysis. *Mol Clin Oncol*. 2018 Mar;8(3):483-8.
55. Zhang J, Ma J, Guo L, et al. Survival Benefit of Metformin Use for Pancreatic Cancer Patients Who Underwent Pancreatectomy: Results From a Meta-Analysis. *Front Med (Lausanne)*. 2020 2020-July-30;7(282):282.
56. Available at: https://clinicaltrials.gov/ct2/results?cond=Pancreatic+Cancer&term=metformin&cntry=&state=&city=&dist=. Accessed May 14, 2021.
57. Gong J, Sachdev E, Robbins LA, et al. Statins and pancreatic cancer. *Oncol Lett.* 2017 Mar;13(3):1035-40.
58. E JY, Lu SE, Lin Y, et al. Differential and Joint Effects of Metformin and Statins on Overall Survival of Elderly Patients with Pancreatic Adenocarcinoma: A Large Population-Based Study. *Cancer Epidemiol Biomarkers Prev*. 2017 Aug;26(8):1225-32.
59. Khurana V, Sheth A, Caldito G, et al. Statins reduce the risk of pancreatic cancer in humans: a case-control study of half a million veterans. *Pancreas*. 2007 Mar;34(2):260-5.
60. Available at: https://clinicaltrials.gov/ct2/results?cond=Pancreatic+Cancer&term=statins&cntry=&state=&city=&dist=. Accessed May 14, 2021.

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
- Myrosinase to release **sulforaphane** in the small intestine

Item #02368

30 enteric-coated vegetarian tablets

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

DOPAMINE, The "FEEL GOOD" Neurotransmitter

Feel Better, THINK More Clearly

Dopamine, the "feel good" neurotransmitter, maintains 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 extract** in each capsule.

Item #02413

30 vegetarian capsules

This product is available at fine health food stores everywhere.

NON GMO LE CERTIFIED

GLUTEN FREE

FIGHT FATIGUE AND STRESS WITH

RHODIOLA EXTRACT

Rhodiola, a European flowering plant, has been used for centuries to enhance mental and physical stamina.

As an *adaptogen*, **Rhodiola** helps bring the body into a state of *balanced energy*.

Helps restore vital cellular energy.

This product is available at fine health food stores everywhere.

GLUTEN FREE

NON GMO LE CERTIFIED

Item #00889

250 mg • 60 vegetarian capsules

45 Times Greater Bioavailability

Curcumin

Patented **turmeric extract** (500 mg) results in **45 times** greater bio-availability of free curcuminoids.

Item #02407

60 vegetarian capsules

Same 500 mg potency patented **turmeric extract** with added benefits of ginger and other turmeric actives.

Item #02324

30 softgels

GLUTEN FREE

NON GMO LE CERTIFIED

These products are available at fine health food stores everywhere.

SALMON

BY LAURIE MATHENA

References
1. *Nutr Res*. 2010 Jul;30(7):447-54.
2. *Neurology*. 2004 Jan 27;62(2):275-80.
3. *Am J Clin Nutr*. 2006 Jul;84(1):5-17.
4. *Mar Drugs*. 2016 Feb 5;14(2):35.

Salmon is truly deserving of the term *superfood*. Studies show that eating salmon can help prevent heart disease and age-related memory loss, and key compounds in salmon could also help you *live longer*.

Eating salmon on a regular basis has been shown to improve risk markers of cardiovascular disease.[1]

Consuming more fatty fish, like salmon, has also been associated with a reduced risk of impaired cognitive function in middle-aged adults.[2]

Salmon contains numerous compounds that likely contribute to its health benefits.

For example, it is one of the best food sources of beneficial omega-3 fatty acids (second only to chia seeds). Diets high in omega-3 fatty acids have been linked to a reduced risk of cardiac and sudden death, and a reduced risk of **all-cause mortality**.[3]

Astaxanthin, the carotenoid that gives salmon its signature pink color, helps reduce the risk of heart disease by reducing the oxidation of LDL cholesterol and increasing HDL (good) cholesterol.[4]

Salmon can be pan-seared, baked, or poached. It pairs well with side dishes like asparagus, roasted broccoli, and lemon-herb couscous.

As with other foods, cooking at lower temperatures protects the proteins in the food against damage that injure your body's proteins via a toxic process known as glycation.

NEW PRODUCTS

This novel **probiotic formula** helps relieve occasional constipation.

Item #02421
30 vegetarian capsules

GLUTEN FREE · 1 DAILY · NON GMO LE CERTIFIED

Think of your digestive tract as a subway route. The first station on the line is your stomach. The last is your colon. The time it takes for food to move from the first station to the last is its "transit time."

First discovered in New Zealand, the *Bifidobacterium lactis* HN019 strain helps fight occasional constipation in as little as 14 days by encouraging the production of specific short chain fatty acids that help your digestive system "move things along."[1]

Our **FLORASSIST® Daily Bowel Regularity** contains the clinically studied dose of *B. lactis* HN019 shown to encourage bowel regularity, and can be taken either by itself or with dietary fiber supplements.

1. Scand J Gastroenterol. 2011;46(9):1057-64.

Your favorite immune health heavyweights, all in one place.

You asked, we answered: Vitamin C, vitamin D, zinc and even a specialized probiotic in our one-stop immune health pack. Vitamin D helps modulate immune function, vitamin C and quercetin promote a healthy immune response, zinc supports your body's defenses, and the special probiotic formulation in our FLORASSIST® Immune & Nasal Defense encourages the production of secretory IgA as well as the activity of natural killer (NK) cells, which your body uses to meet challenges head-on.

We've always offered these nutrients in individual formulations—but now, we've packaged these in 30 individual doses for your convenience. Stay ready with **Immune Packs with Vitamin C & D, Zinc and Probiotic**… only from Life Extension.

Item #02425
30 packets

GLUTEN FREE · NON GMO LE CERTIFIED

BREATHE EASY

N-ACETYL-L-CYSTEINE
Supports Healthy Respiratory Tract Function

N-Acetyl-L-Cysteine (NAC) supports healthy levels of ***glutathione***, a molecule utilized by all cells for protection against free radicals.

NAC is a powerful antioxidant that helps supports bronchial, respiratory, liver and immune health.

This product is available at fine health food stores everywhere.

Item # 01534

600 mg • 60 capsules

GLUTEN FREE

NON GMO LE CERTIFIED

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 healthy 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.

Item #02478

60 vegetarian capsules

Two-month supply

GLUTEN FREE

NON GMO LE CERTIFIED

This product is available at fine health food stores everywhere.

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

7-Keto® brand is a registered trademark of InterHealth N.I. U.S. Patent 7,199,116.

MAGNESIUM | CRITICAL FOR WHOLE-BODY HEALTH

Magnesium is a critically important mineral, yet most Americans do not obtain enough from their diet.

Magnesium helps:[1,2]

- Keep **heart rhythm** steady.
- Promote already-healthy **blood pressure** levels.
- Maintain normal **muscle** and **nerve function**.
- Support a healthy **immune system**.
- Keep **bones strong**.
- Maintain **blood sugar levels** already within normal range.

The recommended intake of magnesium to maintain vascular health is **500 mg** or more a day.

This product is available at fine health food stores everywhere.

Item #01459

500 mg • 100 vegetarian capsules

GLUTEN FREE

NON GMO LE CERTIFIED

References

1. *Am J Clin Nutr.* 1987;45:1305-12.
2. *Clinica Chimica Acta.* 2000;294:1-26.

LIFE EXTENSION®

The Science of a Healthier Life®

PO BOX 407198
FORT LAUDERDALE, FLORIDA 33340-7198

IN THIS EDITION OF *LIFE EXTENSION®* MAGAZINE