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Contributors
Ben Best • Linda Carrington • Michael Downey • Steven Gundry, MD
Susan Lane • Laurie Mathena • Chuck Rossner • Stephanie Stevens

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

Senior Director of Sales and Business Development
Carolyn Bouchard • cbouchard@lifeextension.com • 954-202-7685

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

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

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

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

Thomas F. Crais, MD, FACS, a board-certified plastic surgeon, was medical director of the 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. Dzogan, MD, PhD, was formerly chief of cardiovascular surgery at the Donets Regional Medical Center in Donetsk, Ukraine. Dr. Dzogan’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.

Prof. 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.

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

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

Ross Pelton, RPh, PhD, CCN, is a 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.

Paul Wand, MD, Fort Lauderdale, FL, is a clinical neurologist with special expertise in treating and reversing diabetic peripheral neuropathy and brain injuries from various causes.
Örn Adalsteinsson, PhD, is chairman of the Life Extension® Scientific Advisory board. He holds a master’s and doctorate from the Massachusetts Institute of Technology (MIT). He has specialized in human therapeutics including vaccines, monoclonal antibodies, product development, nutraceuticals, formulations, artificial intelligence, hormones, and nutritional supplementation. He has also authored articles and contributed to peer-reviewed publications and served as an editor for the Journal of Medicinal Food.

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

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

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

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

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

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

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.

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

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

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

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

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

Xiaoxi Wei, PhD, is a chemist, expert in supramolecular assembly and development of synthetic transmembrane nanopores with distinguished selectivity via biomimetic nanoscience. She has expertise in ion channel function and characterization. She founded X-Therma Inc., a company developing a radical new highway towards non-toxic, hyper-effective antifreeze agents to fight unwanted ice formation in regenerative medicine and reduce mechanical icing.
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A wealth of data reveals that cognitive decline is not an inevitable consequence of growing older.¹

Maturing people can exert tremendous control over their rate of brain aging.

For those with mild cognitive impairment, effective protocols to reverse brain deterioration are being validated in human clinical trials.

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Everyone should strive for blood pressure in the lowest tolerable ranges. I keep my blood pressure under 115/75 mmHg. Others require somewhat higher blood pressure to push blood through their damaged circulatory systems.

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In a major finding published in 2019, a group of elderly Americans underwent cognitive testing, MRI scans to assess brain function, and blood tests to assess nutrient status.²

The results identified five categories of plasma nutrients associated with enhanced cognitive performance.² The cognitive tests used in this study measured general intelligence, executive function, and memory.

The plasma nutrients associated with improved cognitive performance include carotenoids (like lycopene), homocysteine-lowering vitamins (folate and B12), vitamin D, and a healthy balance of omega-3 to omega-6 fatty acids.

MRI imaging revealed enhanced brain network connectivity in those with higher plasma carotenoid status and healthy balances of omega-3 and omega-6 fatty acids.

The authors of this 2019 study emphasize that despite abundant evidence in favor of a single nutrient or a few nutrients for cognitive health, clinical trials aimed at slowing brain aging are often unsuccessful.

They postulate this can be explained by the focus on single nutrients and a failure to consider the interactive effects of nutrient combinations.

In their study, higher levels of nutrient combinations measured in blood plasma were associated with enhanced cognitive performance and improved brain network efficiency.

The authors concluded that these findings contribute to “the development of novel nutritional therapies for the targeted treatment and clinical management of cognitive and neurological impairments in the aging brain.”²
In an unprecedented human study, scientists from the University of Illinois used advanced analytical and imaging techniques to examine the relationship between groups of nutrients and their effects on cognition and memory. The study included 116 healthy adults with an average age of 69.2.

The study found that combinations of related plasma nutrients, termed nutrient biomarker patterns, were strongly associated with cognitive function and brain networking efficiency.

This innovative research integrated three different types of measurements:

1) Specific nutrient biomarker patterns in blood (plasma),

2) Cognitive function as assessed by comprehensive mental tests, and

3) Brain network connectivity as measured by specialized functional MRI imaging.

How the Study Was Conducted

The scientists first measured levels of plasma nutrients and grouped them into nutrient biomarker patterns, or classes of related dietary compounds.

Testing plasma nutrients enables levels of absorbed nutrients to be precisely measured. In contrast, many dietary studies rely on self-reported questionnaires, which are notoriously unreliable.

In this study, the authors analyzed a set of 32 plasma nutrient biomarkers related to the Mediterranean diet. This enabled the scientists to determine which combinations of nutrients correlate with healthy cognition and functional brain network connectivity.

This technique provides a powerful method for capturing interactive effects of multiple nutrients as opposed to studying an individual nutrient in isolation.

After the blood draw to measure plasma nutrients, study subjects underwent comprehensive cognitive testing to measure overall intelligence, executive function, and memory.

Functional MRI imaging was then used to assess efficiency of brain network connectivity.

What the Study Uncovered

Specific nutrient biomarker patterns were associated with better cognitive performance as follows:

- A proper balance of certain omega-3 and omega-6 fatty acids was associated with higher function of two domains of memory;
- Higher levels of lycopene were correlated with better scores in three separate domains of memory and with better executive function;
- Higher levels of the omega-3 fatty acids EPA, DHA, and DPA were strongly linked to better executive function and higher overall intelligence;
- Carotenoids including trans-lutein were positively associated with two measures of intelligence;
- The grouping of the homocysteine-reducing B-vitamins (vitamin B2, folate, B12) and vitamin D was associated with better executive function.

Additionally, functional MRI analysis revealed that three nutrient biomarker patterns significantly influenced the relationship between functional brain connectivity networks and measures of intelligence and cognitive function.

The study’s findings regarding the benefits of lycopene on memory and executive function are not unexpected.

Human and animal studies have previously shown that lycopene may protect the brain against aging and...
cognitive decline, and that higher levels are associated with lower Alzheimer’s mortality and less severe dementia.4,6

Higher omega-3 status was related with overall intelligence, while omega-6 fatty acid balance and lycopene were associated with better executive function.

**Impact of Excess Omega-6 Fats on The Brain**

Most modern diets contain excessive amounts of omega-6s and insufficient amounts of omega-3s.

An unfavorable omega-6 to omega-3 ratio has an adverse impact on brain function.7

The 2019 published human study that measured plasma nutrient levels found that proper balance of omega-6 to omega-3 fatty acids is associated with higher function of two measures of memory.

The optimal omega-6 to omega-3 ratio approaches 4:1. This means you want about four omega-6 fatty acids for each one omega-3 in your blood plasma.

This study found higher plasma levels of omega-3s to be strongly linked to better executive function and higher overall intelligence.

These findings corroborate the results of an earlier randomized controlled trial that found that supplementation with omega-3 fatty acids improves brain structure, function, and cognitive outcomes.6 Additional studies link omega-3 fatty acids to global cognition,3-14 general intelligence,15 memory,16-18 and executive function.8,19,20

The totality of this data provides a powerful basis for aging humans to alter their dietary patterns to preserve neurological functions.

The problem is that typical dietary ratios of omega-6 to omega-3 fatty acids are far in excess of optimal ratios identified in this and other studies.

On average in the United States, the omega-6 to omega-3 ratio is a disastrous 16:1. This means that a typical American eats 16 times more omega-6 fats than omega-3s.

You can cut down on omega-6 intake by reducing consumption of processed and fast foods, fatty meats, cured meats and polyunsaturated vegetable oils (corn, sunflower, safflower, soybean, and cottonseed oils).

Use extra virgin olive oil for cooking and in salad dressings. Olive oil is a good substitute because it provides beneficial monounsaturated fats that can take the place of omega-6 fats that are so pervasive in Western diets.

Eat more oily fish and take a high-potency fish oil supplement to boost your omega-3 plasma levels.

**The Omega-6 Dilemma**

Our brain and body require omega-6 fatty acids to sustain life.

The problem with modern diets is excess consumption of omega-6 fats and deficient intake of omega-3s.

Research suggests that too many omega-6 fats increase risk of cardiovascular disease,21 cancer,22,23 inflammation,24,25 and neurodegeneration.26-29

For most people, the amount of dietary omega-6 fats should be reduced and omega-3 consumption increased.
Foods high in omega-6 fats include processed snacks and fast foods.

Refined vegetable fats, such as soybean oil, are used in cookies, crackers, sweets, salad dressings and most fried foods. Soybean oil is so ubiquitous that an astounding percent of calories in the American diet are estimated to come from this single omega-6 source.

Poultry (chicken, turkey, duck), which many people eat in lieu of red meat, is a rich source of omega-6 fats. A chicken leg contains about 1,800 mg of omega-6 fatty acids. Turkey contains almost as many omega-6s as chicken while duck contains less.

When a smaller amount of chicken is fried in vegetable oil and eaten as part of a fast food chicken sandwich, the amount of omega-6 fats surges to over 12,000 mg. If you have a salad with a soybean or safflower oil dressing, you’d consume about 7,200 mg of additional omega-6 fats.

So, a meal from a fast food restaurant consisting of a fried chicken sandwich and salad can result in over 17,000 mg of omega-6 fats being eaten.

The ideal ratio of omega-6 to omega-3 consumption is about 4 to 1. This means for each four omega-6s you eat, you should compensate with one omega-3. This 4-to-1 ratio, however, is difficult for most people to accomplish.

A typical serving of wild salmon may provide 2,000 mg of omega-3s. As fish farming becomes more prevalent, however, the amount of omega-3s contained in fish meals has declined.

We at Life Extension recommend that people take about 2,400 mg of omega-3s (EPA/DHA) from fish oil supplements each day.

You then can ingest as many as 16,000 mg of omega-6s each day and potentially achieve a healthy 4:1 plasma ratio of omega-6 to omega-3 fatty acids. This means four omega-6 fats for every one omega-3.

To make sure you understand this, under this scenario, if you consume 16,000 mg of omega-6s a day along with 4,000 mg of omega-3s, your plasma levels may achieve a healthy 4-to-1 ratio.

In an ideal world, you’d want to ingest an almost equal number of omega-6 and omega-3 fatty acids. I personally strive towards a 1-to-1 ratio of ingested omega-6 to omega-3 fats but understand we each have differing dietary patterns.

When considering that the average American eats 16 times more omega-6 fats than omega-3s (16:1 ratio), a 4-to-1 ratio (4:1) is a huge improvement.

The sidebar on the next page provides some examples of foods high in omega-6s that you may want to reduce or eliminate from your diet.
Foods High in Omega-6 Fatty Acids

Omega-6 fats are essential to sustain life. You cannot live without them.

The problem is that modern dietary practices provide too many omega-6-rich foods and not enough omega-3s.

Table 1 on this page reveals strikingly high amounts of omega-6 fats in common foods.

The sheer volume of ingested omega-6 fats contributes to a host of age-related diseases including neurodegeneration.

By reducing intake of foods high in omega-6 fats, you can achieve a healthier balance of fatty acids in your plasma. This, in turn, has been shown to improve cognitive performance and brain health.

Below is a quote from the 2019 published study that measured plasma nutrients and correlated them to neurological performance/function:

“Accumulating evidence indicates that omega-6s confer beneficial effects on cognitive performance when their ratio with respect to omega-3 polyunsaturated fatty acids approaches one. The ratio of omega-6 to omega-3 NBPs [nutrient biomarker patterns] observed in the present study [approximates] the ideal ratio needed to confer benefits to cognitive performance and brain health.”

Said differently, the authors of this 2019 study advocate for drastic reductions in ingested omega-6 fats and increases in omega-3s. They advise that for each milligram of omega-6 fat you eat, consume about an equal amount of omega-3.

<table>
<thead>
<tr>
<th>Table 1. Omega-6 Content of Common Foods</th>
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<tbody>
<tr>
<td>Food</td>
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<tr>
<td>-----------------------------</td>
</tr>
<tr>
<td>Sweet and sour chicken, one serving (Chinese restaurant)</td>
</tr>
<tr>
<td>Crunchy onion rings, one serving (Applebee’s)</td>
</tr>
<tr>
<td>Sunflower seeds, oil-roasted, 2 ounces</td>
</tr>
<tr>
<td>French fries, one serving (T.G.I. Friday’s)</td>
</tr>
<tr>
<td>Coleslaw, one serving (Denny’s)</td>
</tr>
<tr>
<td>Plain potato chips, 1 ounce</td>
</tr>
<tr>
<td>Taco salad, one serving (Taco Bell)</td>
</tr>
<tr>
<td>Chocolate cake, small slice</td>
</tr>
<tr>
<td>Fried chicken breast (212 grams) (KFC)</td>
</tr>
<tr>
<td>Fried fish fillet, one serving (201 grams) (Denny’s)</td>
</tr>
<tr>
<td>Macaroni and cheese, one serving (175 grams) (Cracker Barrel)</td>
</tr>
<tr>
<td>Single hamburger with cheese, one (236 grams) (Wendy’s Classic Single)</td>
</tr>
<tr>
<td>Cream of mushroom soup, condensed, cup (128 grams) (Campbell’s^8)</td>
</tr>
<tr>
<td>Ramen noodle soup, one package (81 grams) (Campbell’s^8)</td>
</tr>
<tr>
<td>Edamame, one cup (155 grams)</td>
</tr>
<tr>
<td>Ready-to-drink nutritional shake, one serving (8 fl oz) (Ensure)</td>
</tr>
<tr>
<td>Pound cake, one serving (55 grams)</td>
</tr>
<tr>
<td>Frozen red raspberries, one cup (140 grams)</td>
</tr>
</tbody>
</table>
When it comes to the fatty acid content of most foods, it is important to understand that most contain **omega-6s** and **omega-3s**.

For each 1 **omega-6** fatty acid in **salmon** there are 7 to 20 **omega-3** fatty acids.53

**Wild salmon** contains more omega-3s compared to **farm-raised salmon**. Cold-water fish provide the highest amounts of dietary omega-3s compared to omega-6s.

**Walnuts** are high in an **omega-3** that can be converted to **EPA** and **DHA** in some, but not all people’s bodies. Like other nuts, however, walnuts also contain lots of **omega-6s**.

For each 1 **omega-3** fatty acid in **walnuts** there are 4 **omega-6s**.53

Walnuts represent a reasonable ratio of omega-3s to omega-6s for people to strive for, i.e. four omega-6s to each one omega-3.

Regular ingestion of walnuts is associated with cardiovascular and other health benefits.

If individuals were to subsist mostly on **fish**- and **walnut**-type foods, they would likely achieve a near-optimal **omega-6 to omega-3 ratio**.

The problem is that typical, overall diets are laden with omega-6s. **Peanut butter** contains a whopping 330 times more **omega-6s** than **omega-3s**.

Table 2 reveals that even those who consume a lot of nuts are getting far more omega-6s than omega-3s.

To protect against cognitive decline, chronic inflammation and cardiovascular disorders, one should **reduce** ingestion of foods high in **omega-6 fats**.

Since foods containing high amounts of omega-6s are so prevalent, ingesting **cold-water fish** and **omega-3 supplements** is virtually mandatory to achieve a healthy **plasma balance** of omega-3s and omega-6s.

To reiterate, **omega-6 fats** are essential to sustain life and brain function. The dilemma is that even foods perceived as healthier, such as poultry, salad dressings and nuts, are often laden with omega-6 fats.

By offsetting dietary **omega-6 fats** with **omega-3-rich foods** and **supplements**, one can enjoy a more diverse diet and still achieve a healthy **plasma balance** of omega-6 to omega-3 fatty acids.

### Table 2. Omega 6:3 Ratio of Common Nuts and Seeds

<table>
<thead>
<tr>
<th>Nuts and Seeds</th>
<th>Omega 6:3 Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almonds</td>
<td>2,157:1</td>
</tr>
<tr>
<td>Brazil Nuts</td>
<td>1,354:1</td>
</tr>
<tr>
<td>Pine Nuts</td>
<td>300:1</td>
</tr>
<tr>
<td>Cashews</td>
<td>125:1</td>
</tr>
<tr>
<td>Pistachio Nuts</td>
<td>49:1</td>
</tr>
<tr>
<td>Pecans</td>
<td>21:1</td>
</tr>
<tr>
<td>Macadamia Nuts</td>
<td>6:1</td>
</tr>
<tr>
<td>Walnuts</td>
<td>4:1</td>
</tr>
<tr>
<td>Flax Seeds</td>
<td>1:4</td>
</tr>
<tr>
<td>Chia Seeds</td>
<td>1:3</td>
</tr>
</tbody>
</table>

This table shows that most commonly ingested nuts (except walnuts, flax seeds, and chia seeds) contain huge amounts of omega-6 fats relative to omega-3s.
A New Term: “Dementia Prevention”

In the 2019 study that measured levels of plasma nutrients in relationship to brain function, the term “dementia prevention” was used in the introductory text as follows: “Accumulating evidence indicates that diet and the many bioactive substances present in food are reasonable interventions to examine for dementia prevention.”

Readers of this magazine should appreciate that these dietary positions are finally being promulgated by mainstream doctors.

Previous generations of medical professionals and scientists were often adamant that diet and healthy ingredients in food (such as carotenoids, vitamins and omega-3s) had no benefit for cognitive or overall health.

The 2019 published study adds to a growing volume of evidence that healthy dietary choices (including specific carotenoids, vitamins, and fatty acids) can help preserve brain function in aging people.

A larger study published later in 2019 examined data on 9,772 adults (up to age 79) and looked for associations between brain structure and vascular risk factors. Except for high cholesterol, they found all of the other vascular risk factors (smoking, high blood pressure, high pulse pressure, diabetes, and obesity) to be linked to brain changes seen in dementia.

The more vascular risk factors, the poorer brain health. This was evidenced by MRI imaging showing greater brain shrinkage and less gray and white matter brain tissues.

Remarkable Declines in Dementia Prevalence

Although dementia impacts a large group of the aging population, the percent of Americans who lose functional independence as a result of dementia has been sharply declining, starting around the year 1980.

This is due to an increase in levels of education and better control over cardiovascular risk factors. Healthy steps taken to prevent heart attack risk also decrease dementia risk.

The overall number of Americans afflicted with dementia is expected to triple by the year 2050.

The percent of Americans who lose functional independence as a result of dementia, however, has been sharply declining starting around the year 1980.

Whether you become a victim has a lot to do with your health behavior patterns.

Validation of Healthy Lifestyle Behaviors

A study published in the Journal of the American Medical Association (2017) found that people who take steps to protect against heart disease also reduce their risk of memory loss, vascular dementia, and Alzheimer’s.

Long-time readers of this publication have been urged to keep blood pressure, LDL cholesterol, glucose, and other cardiovascular risk factors (like homocysteine) in low normal ranges.

The declines in dementia prevalence since year 1980 are a result of people practicing healthy behavior patterns. This includes the surging use of nutritional supplements that has occurred in recent decades.

Consumption of fish meals and fish oil supplements has grown exponentially since 1980, as well as intake of homocysteine-lowering vitamins.

An article in this month’s issue describes how reducing homocysteine confers remarkable protective effects against premature brain aging.

Life Extension introduced lycopene as a dietary supplement (in 1985) and it is now included in a range of nutrient formulas sold by many commercial companies.

Those who follow healthy lifestyle patterns are reaping huge rewards by winning the war against degenerative brain aging.

The 2019 study correlating higher plasma nutrient levels with enhanced brain function and cognitive performance reveals the importance of following science-based dietary and supplement practices.

For longer life,

William Faloon, Co-Founder
Life Extension Buyers Club
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References


References


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Brain Changes in Hypertensive Patients Linked to Mild Cognitive Impairment

A study published in the journal Hypertension has further confirmed the impact of hypertension on cognition.*

Researchers followed 345 individuals with high blood pressure for almost four years. They determined cognitive function using the Dementia Rating Scale, and they used MRIs to measure changes in the brain.

Study subjects who experienced marked progression in periventricular white matter hyperintensities had a six-fold higher incidence of mild cognitive impairment compared to individuals without this progression. They also experienced a decrease in global cognition.

Numerous studies link hypertension to accelerated brain aging. This study identified specific damage inflicted to the brains of people with high blood pressure over a relatively short time period (less than 4 years).

Editor’s Note: Healthy blood pressure is less than 120/80 mmHg, and Life Extension® recommends an optimal target of 115/75 mmHg. Maintaining an optimal blood pressure may lower the progression of cerebral white matter lesions and result in a lower incidence of mild cognitive impairment.

Protective Effect of Fish Oil Supplementation During Pregnancy

Studies have shown that a mother’s overeating during pregnancy increases the child’s susceptibility, once they reach adulthood, to chronic diseases such as obesity, type II diabetes, and cardiovascular disease.*

Researchers wanted to find out if fish oil supplementation during pregnancy could prevent fatty liver in the offspring, which occurs when too much fat is stored in the liver cells.

For the study, rats were fed a cafeteria diet, which provided them with high-fat, high-salt, and low-fiber foods such as cookies, chips, and processed meat. This diet creates a more accurate model of human metabolic syndrome than the traditional high-fat diet used in models of diet-induced obesity.

Some rats received fish oil supplementation during the first half of pregnancy, some received it throughout pregnancy and lactation, and some got no fish oil at all.

The offspring of the rats fed the cafeteria diet without fish oil experienced increases in numerous markers that are indicative of fatty liver. However, these differences disappeared in rats whose mothers were supplemented with fish oil.

This study showed that supplementing with fish oil either during the first half of pregnancy, or throughout pregnancy and lactation, prevented fatty liver in adult male offspring in rats consuming highly palatable, energy-dense foods that are prevalent in Western society.

Editor’s Note: Previous studies had shown that fish oil supplementation during pregnancy could reduce the risk of adult disease in the offspring, but this is the first study to show the protective effect of supplementation during just the first half of pregnancy.

Dry Eye Improvement with Omega-3 Supplementation

Results from a meta-analysis concluded that there was a benefit for supplementation with omega-3 fatty acids in patients with dry eye disease, reported a study published in the journal Cornea.*

Researchers at the University of Bologna, in Italy, selected 17 randomized trials that evaluated the effects of omega-3 fatty acid supplementation in 3,363 participants with dry eye.

Subjects included men and women with dry eye disease caused by meibomian gland dysfunction, visual display terminal use, Sjögren syndrome, contact lens wear, rosacea and unspecified causes. Average follow-up periods ranged from one to 12 months.

In a pooled analysis of all participants, omega-3 fatty acid supplementation was associated with a reduction in dry eye symptoms and corneal fluorescein staining (an indicator of corneal abrasion) in comparison with a placebo. Tear breakup time and Schirmer test values (a measure of tear production) increased in association with omega-3.

Editor’s Note: “Based on current evidence available, omega-3 fatty acid supplementation may be recommended in clinical practice for treatment of this condition,” the authors concluded.

Scientists Call for More Consistent Radiation Doses from CT Scans

Computed tomography (CT) scans are beneficial because they help diagnose a range of conditions, but the radiation from CT scans is associated with an increased risk of cancer.* This makes it important to use the smallest radiation dose possible.

Studies have shown that radiation doses from CT scans vary widely. In many cases, they can be reduced by 50% or more without reducing quality or accuracy.

To find out the underlying reasons for the variation, researchers analyzed more than two million CT scans from 151 institutions across seven countries. They found that how the scanners were used by the medical staff was the primary factor responsible for the wide variation in radiation doses, as opposed to differences in the patients scanned, the specific machine used, or the type of institution using it.

Editor's Note: This study indicates that it is possible to establish more consistent radiation dose standards. Doing so will help ensure that patients aren’t exposed to unnecessary radiation risks. When a CT scan is needed, ask for the lowest radiation intensity to be used.

* BMJ. 2019 Jan 2;364:k4931.
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Two-Per-Day Tablets
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</tbody>
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The Healthy Way to Get the Benefits of KETONES
Lately it seems like everyone’s trying **ketogenic diets** to lose weight.

**Ketones** are compounds normally produced in the body during times of **fasting**. They provide easy-to-use energy to the brain and muscles.

Ketones have been linked to longevity in animal models, and to improved metabolism in humans and animals.1-8

By severely limiting carbohydrate intake, we can mimic some of the metabolic effects of fasting, leading to increased production of ketones.

Studies have shown that carbohydrate restriction can lead to improved energy metabolism, reduced blood sugar, weight loss, and more. In one animal study, increasing ketone blood levels **extended the average lifespan by approximately 20%**.1

But many doctors warn **against** trying ketogenic diets. For one, they’re notoriously difficult to maintain. And they often require people to increase their intake of unhealthy fats.

As a result, some of these diets have been tied to **higher** risk for cardiovascular disease and overall **increased** risk of premature death.9-11

Scientists have identified a potential solution. They’ve found a way to safely raise blood levels of **ketones**—and even enhance the body’s ability to produce its own ketones—**without resorting to harmful high-fat diets**.
What Are Ketones?
Glucose, largely derived from carbohydrates, is the standard energy source for most cells.
In times of prolonged fasting, when glucose is low, the liver is forced to produce an alternative fuel source, ketones, which it makes from stored fats.
Science has found that ketones offer advantages over glucose. They’re more energy efficient and are effective energy sources for tissues with high metabolic rates like the brain and muscles.
Even more important, they’ve been linked to increased longevity in animal models and improved metabolism in human and animal studies.
Two of the principal ketones are acetocacetate and beta-hydroxybutyrate (BHB). These compounds can be broken down by cells to provide energy.
BHB, created from fatty acids in the liver, not only regulates energy expenditure, it also helps modulate metabolism.
Ketones are superior to other fuel sources for two main reasons:

1. Unlike carbohydrates, ketones do not raise blood glucose levels and do not stimulate insulin secretion.

2. Ketones require less processing than glucose to harness their energy. That means they consume less NAD+ in their metabolism, leaving more of it circulating in the body. NAD+ helps repair damaged DNA, and slow certain aging processes.

Ketones aren’t just an alternative fuel source. They change our metabolism, mimicking many of the beneficial effects of caloric restriction, and intermittent-fasting diets. That reduces risk factors for metabolic disease, diabetes, and cardiovascular disease.
In addition, ketones have recently been discovered to be important signaling compounds, activating longevity pathways that protect cells from age-related damage and deterioration.

Increased Longevity
Ketones provide life-extending effects similar to those attributable to caloric restriction and fasting, including maintaining protective levels of NAD+ in cells.
NAD+ is critical for vital cellular processes. Sirtuins are proteins in cells that have lifespan-extending properties. Sirtuins require NAD+ to function properly.

In animal studies, increasing ketone levels in the body leads to higher levels of NAD+ and a boost in sirtuin function. This reduces damage to DNA, which is associated with age-related disease and dysfunction.
For example, in one study of the roundworm C. elegans, a common model organism for research on longevity, supplementing its diet with the ketone beta-hydroxybutyrate increased the average lifespan by approximately 20%.
This effect has also been shown in mammals. In aging mice, diets that boost blood ketone levels extend lifespan by approximately 14%. Even more importantly, ketones prolong healthy life, or healthspan.

Improved Metabolic and Physical Health
Using ketones as an energy source improves our metabolism, reducing risk factors for cardiovascular disease, diabetes, and other conditions. It also provides a potent fuel to muscles to enhance physical fitness.
In one study, rats were fed a diet in which 30% of calories were derived from ketones. This caused a reduction in cholesterol and triglyceride levels.
The rats also showed a boost in physical ability: They ran an average of 32% farther on a treadmill than rats fed a regular diet over a five-day period.
The metabolic benefits of ketones have been demonstrated in humans as well. A study recently published in *The Journal of Physiology* found that healthy, young adults given a ketone supplement showed improvements in metabolism during an oral glucose tolerance test. After ketone supplementation, beta-hydroxybutyrate levels went up, total blood glucose elevation during the oral glucose tolerance test was lower, fatty acid levels decreased, and insulin sensitivity improved by about 11%.

These findings suggest that acute ketone supplementation may improve markers of metabolic response to an oral glucose load.

**A Boost in Brain Health**

Ketones are easily used by the brain as a fuel source. Not only can this improve brain function, it can also have a *neuroprotective* effect, shielding against age-related cognitive decline.

In roundworms, the ketone *beta-hydroxybutyrate* helps protect against the harmful effects of two abnormal proteins that contribute to the development of Alzheimer’s and Parkinson’s disease. In aging mice, memory and other cognitive functions are preserved and improved through dietary enhancement with ketones.

This link between ketones and brain function carries over to humans. People with Alzheimer’s disease, the most common form of dementia, tend to have lower blood levels of ketones.

---

**Boost Ketones Without a Risky Diet**

- **Ketones** are compounds produced by the liver during times of fasting or extremely low carbohydrate intake.
- Ketones are used as an alternative fuel by the brain and muscles. They also activate pathways linked to lifespan and health-span extension.
- The *ketogenic diet* stimulates ketone production but requires extremely high fat intake that has harmful health consequences.
- Safer alternatives directly supply ketones that can be absorbed and used by the body. *Beta-hydroxybutyrate* regulates energy expenditure and helps modulate metabolism. *Mangiferin* and a resistant starch also boost the body’s ability to make its own ketones.
- It is now possible to obtain the benefits of ketones without the difficulties and downsides associated with prolonged fasting or the *ketogenic diet*.
In people with cognitive dysfunction, the brain’s ability to use glucose as a fuel appears to be impaired. A study published in The Neurobiology of Aging explored whether raising blood levels of the ketone beta-hydroxybutyrate, an alternative fuel, could improve their brain function.16

Subjects with Alzheimer’s or mild cognitive impairment, a common precursor to Alzheimer’s, were given a supplement drink that raised blood ketone levels. The increase in ketones in most study subjects correlated with improvements in cognitive function, particularly memory.16

**Issues with the Ketogenic Diet**

One way to raise ketone levels is by forcing the body to create more of them. That’s the goal of the popular ketogenic diet. Severely restricting carbohydrate intake and replacing those calories with a large amount of fat makes the liver pump out ketones. But there are several downsides to this strategy:

- Eliminating carbs means dramatically reducing intake of fruits, vegetables, and whole grains. These foods are a source of dietary fiber, which is critical for digestive health. Insufficient fiber has been linked to gastrointestinal disorders and colorectal cancer.17,18

- Very low carbohydrate intake has been linked to premature mortality.11

- A high-fat diet can cause elevated triglycerides, other lipid abnormalities, and detrimental metabolic changes, all risk factors for cardiovascular disease.10,19

- In people on a ketogenic diet, the risk of atherosclerotic plaque development in arteries, which often leads to cardiovascular disease, may be increased.9

- High-fat, low-carb diets can negate or even reverse the brain benefits of ketones, leading to deterioration in attention, processing speed, and mood.10

In other words, the potential problems of the ketogenic diet may outweigh the benefits. It is not recommended for people unless they have a specific medical condition for which it is indicated.

**Raise Ketones the Healthy Way**

Scientists recently set out to create a healthier way to raise ketone levels without the risks of the ketogenic diet or prolonged fasting. They accomplished this by combining the ketone beta-hydroxybutyrate with two other nutrients that aid in the body’s ketone production.

When ingested orally, beta-hydroxybutyrate is easily absorbed into the bloodstream, providing the same benefits as ketones produced by the liver. Beta-hydroxybutyrate can increase blood levels to the range typically induced by a ketogenic diet.20

Mangiferin is a compound found in plants, especially mangos—hence the name. It has been shown to help spur the production of more ketones by the body.

In one randomized trial, researchers demonstrated that 150 mg of mangiferin per day significantly increased blood levels of ketones, presumably by stimulating the liver to boost production of them.21

In response to mangiferin supplementation, beta-hydroxybutyrate increased by about 18% and acetoacetate levels increased by approximately 10%.

A resistant starch, like cassava, is a complex carbohydrate that is not efficiently broken down by our digestive enzymes.22
Benefits of “Resistant Starch”

Other forms of starch are broken down into simpler carbohydrates, which raise blood sugar levels after a meal, triggering insulin secretion. Because they are not digested rapidly by humans, resistant starches do not raise blood glucose or cause an insulin response.

Besides being a source of fiber, resistant starches have several other beneficial effects. They help support healthy gut bacterial growth, promote a feeling of fullness, increase insulin sensitivity, and preserve lean body mass.23

Resistant starches also enhance the body's production of butyrate, which is used to make more ketones, and to stimulate many of the same longevity-promoting pathways as ketones.5,24,25

Summary

Ketones are an alternative fuel for our cells, with several advantages over glucose. Normally produced by the liver during fasting, ketones are quicker and easier to metabolize than glucose and provide a potent energy source for the brain and muscles. They also activate pathways tied to improved healthspan and longevity.

The most popular ways to increase production of ketones are by prolonged fasting or the ketogenic diet. High fat ketogenic diets, however, are potentially dangerous, negating the benefits of the increased ketones.

Scientists have now developed a safer alternative that directly supplies beneficial ketones and boosts the body's ability to produce ketones. It does so without the harmful effects of ketogenic diets.

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

References

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References

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Burnout is real.

In May 2019, the World Health Organization officially included it in its International Classification of Diseases.

This recognition confirmed that burnout was not a figment of the imagination, or something suffered only by “weak” or “unmotivated” people.¹

Medical treatments are limited. The Mayo Clinic recommends sleep and relaxation.²

But now there’s hope for the 30% to 72% of working people who suffer from burnout syndrome.³⁴

In a recent, human trial, patients who took an extract of the herb Rhodiola had deep reductions in burnout symptoms in just one week.

That included a decrease in feelings of overload, tension, fatigue, and overall stress.

At the same time, Rhodiola led to improvements in high-level cognition and decision-making.⁵

This recent clinical trial plus prior studies show this low-cost plant extract provides a much-needed approach to burnout syndrome, which may encompass many aspects of normal aging.
The Truth About Burnout

Workplace stress is increasing around the world.6

The combination of work-related pressure, fatigue, and exhaustion has long been referred to, informally, as burnout. But until 2019, it had no official definition.

That changed with the recognition of occupational burnout, in the newest version of the International Classification of Diseases, as “a syndrome...resulting from chronic workplace stress that has not been successfully managed.”1

The definition lists three symptoms of burnout:1

• Feelings of low energy or exhaustion,
• Increased mental “distance” from one’s job, or feelings of negativity or cynicism about the job, and
• Reduced professional efficacy (the ability to get a job done well).

Practically every working person is at risk for burnout. Rates run from 30% in teachers and medical students to as high as 72% among some highly-stressed professionals.3,4,6

But because burnout wasn’t even considered a real syndrome until recently, few treatments were available.

What Is Rhodiola?

Rhodiola rosea is an herb that grows in cold, mountainous regions of Europe and Asia.

Its roots are rich in beneficial compounds, including a group of substances with a wide variety of health benefits called phenylpropanoids. These include rosavin, rosin, and rosarin, that are found only in Rhodiola.5

Rhodiola root is known as an adaptogen, a plant that helps the body adapt to and resist physical, environmental, and oxidative stress.5,7

Dried Rhodiola extract has been used for centuries to relieve stress and reduce fatigue.5,8,9

Unlike drugs that stimulate the central nervous system, Rhodiola can enhance performance without a later “crash,” or loss of work capacity.10-12 Indeed, Rhodiola provides both emotional stabilization and mental stimulation.

Rhodiola Relieves Burnout

Burnout is brought on and exacerbated by stress. Because Rhodiola contains proven anti-stress properties,9,13-15 researchers decided to test whether it could relieve burnout syndrome.5

In a first-ever clinical trial exploring the impact of Rhodiola on burnout, Austrian researchers enrolled outpatients aged 30-60 who suffered from burnout symptoms.5
Patients were given 200 mg of Rhodiola extract twice daily for three months. The 68 subjects who completed the study were assessed before starting, again on day seven, and at weeks four, eight, and 12. The study showed significant decreases in scores on a standard burnout measure over the course of the study.

Self-reported symptoms of stress fell sharply in all seven categories measured, with the steepest decline in the first week of the study.

On a Perceived Stress Questionnaire, subjects showed significant improvement in all of the following categories:

- Overall stress score
- Fatigue
- Feeling harassed
- Irritability
- Lack of joy
- Overload
- Tension
- Worry

Significant improvements were also seen in sex life and on a Patient Sexual Function Questionnaire, including ability to become aroused, frequency of sexual activity, ability to reach orgasm, and overall satisfaction with sex life.

These findings are vital for sufferers of burnout, whose sexual enjoyment is often impaired, leading to more stress.

Unlike anti-anxiety medications that can leave users with confusion or trouble concentrating, Rhodiola extract led to significant improvements on a test that assessed executive function (high-level cognition, decision-making, and sorting), that is impaired by burnout.

It also boosted overall mood, including feelings of alertness and calmness.

Reducing Stress

A study showed for the first time that Rhodiola extract can ease the symptoms of burnout. Many past studies have demonstrated that Rhodiola is an effective stress reliever.

Stress is a reaction to external threats or pressures, marked by symptoms of exhaustion, energy loss, irritability, and tension. Untreated chronic stress underlies burnout.
Most anti-anxiety drugs come with undesirable side effects and potential for addiction. But studies conducted over the past decade have established that Rhodiola has an excellent safety profile, with no serious side effects of any kind.\(^5\)\(^9\)\(^,\)\(^18\)

In fact, because of its documented ability to safely reduce the release of stress hormones like cortisol, while also boosting energy,\(^9\)\(^,\)\(^12\)\(^,\)\(^19\) Rhodiola is now the main adaptogen approved for stress relief by the European Medicines Agency’s Committee on Herbal Medicinal Products.

One clinical study revealed that doses of 200 mg twice daily result in a significant reduction in stress symptoms.\(^18\) In another study, Rhodiola extract significantly reduced stress-related fatigue while increasing mental performance, especially the ability to concentrate.\(^19\)

### Summary

**Burnout** has officially been included by the World Health Organization in its International Classification of Diseases.

An extract of the herb *Rhodiola rosea*, an adaptogen approved by European authorities for use in stress, has been shown to be effective in reducing its symptoms.

People who took 200 mg of Rhodiola extract twice daily for three months experienced improvements in all three main symptoms of burnout: exhaustion, cynicism, and lack of efficacy.

Rhodiola’s burnout-fighting properties are tied to its ability to lower stress, which may be due in part to its ability to decrease excessive levels of the stress hormone cortisol.

In the recent study of burnout and Rhodiola, subjects also saw improvements in how well their brains functioned.

People feeling stressed and burned out now have hope, because this natural plant extract has been proven to help.

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

Item #01713 - 5,000 IU - 60 softgels
1 bottle $7.50
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For full product description and to order Vitamin D3, call 1-800-544-4440 or visit www.LifeExtension.com

Caution: Individuals consuming more than 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 10,000 IU per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels.

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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.

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Senescent cells are old cells that no longer divide but they emit factors that accelerate aging.

Senolytic compounds selectively help target senescent cells in the body. Laboratory studies show evidence of systemic rejuvenation when the senescent cell burden is reduced.

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1 box $18

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(Each box lasts three months.)

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Clove Extract Lowers Blood Sugar

BY LINDA CARRINGTON

When our ability to metabolize blood sugar breaks down, it sets off a cascade of harmful events that accelerates systemic aging. Even “high normal” blood sugar raises heart disease and stroke risk.1-3

This loss of glucose control motivated scientists to evaluate whether an extract from cloves can lower elevated blood sugar (glucose).

In a pilot study, a standardized clove extract was tested on healthy people and those with prediabetes.

The study results found lower after-meal blood sugar in healthy adults and prediabetics supplemented with polyphenol-rich clove extract.4

In the prediabetic part of the study, fasting glucose levels were also lowered in the clove-supplemented participants.

These findings indicate that a standardized clove extract can benefit aging individuals who have less-than-optimal glucose control.

This is especially important for prediabetics, who often suffer high after-meal glucose for years before the onset of type II diabetes or diabetic complications.
Diabetes Rates Skyrocket

Roughly 25% of Americans over 65 have type II diabetes, and about half of older Americans have prediabetes.5,6

Prediabetes may have “normal” fasting blood sugar levels, but often can’t properly handle glucose after a meal.

Unless they make substantial changes to their diet and lifestyle, up to 30% of prediabetics will go on to develop type II diabetes in only three to five years.

Even if progression to full-blown diabetes does not occur, prediabetes increases the risk for heart disease and stroke.7,8

Younger adults (aged 25-44) are now more than twice as likely to have diabetes and to be overweight than they were 30 years ago.4,9

Studies have shown that polyphenols, health-promoting nutrients found in plants, lower the risk of multiple diseases.4,10-12

Diets low in polyphenols are strongly associated with increased risk of type II diabetes.13-15

These findings are driving the search for naturally occurring polyphenols that can lower blood sugar and help prevent type II diabetes and metabolic syndrome.

New Human Study on Cloves

Cloves are dried flower buds of the Syzygium aromaticum tree, which have been used as a spice for centuries.16

In past studies, this clove extract demonstrated benefits in the liver, a key area of the body (along with fat and muscle) involved in insulin resistance. (Insulin resistance is an underlying abnormality that leads to prediabetes and diabetes.4,18,19)

These findings led scientists to hypothesize that polyphenol-rich clove extract is likely to have benefits for glucose metabolism in adult humans.

In a paper published in May 2019 in the journal BMC Complementary and Alternative Medicine, researchers demonstrated blood-sugar-reducing effects of a polyphenol-rich-reducing extract in healthy and prediabetic people.4

What the Study Showed

Fasting blood sugar levels have traditionally been used to identify those with, or at risk for, type II diabetes. But after-meal blood sugar (glucose) levels are also an important indicator of disease risk.4,20

Studies show that after-meal blood sugar elevations are closely associated with cardiovascular disease and death.21-23 In older diabetics, large swings in post-meal glucose also appear to contribute to impaired cognitive function.24

An intervention that can delay or prevent elevated after-meal glucose is likely to help prevent blood sugar disturbances and metabolic syndrome.4

For these reasons, Life Extension® scientists collaborated with scientific colleagues in the Department of Biochemistry at St. Thomas College in India and Akay to evaluate before-and after-meal glucose levels in response to a polyphenolic clove extract supplement.4

Researchers enrolled 13 healthy volunteers (aged 25-35), dividing them into two groups based on their initial pre-meal glucose levels.

Group I had fasting glucose levels at or below 100 mg/dL (“normal”), and Group II had prediabetic levels of 101-125 mg/dL.4
These results are impressive for several reasons. Unless one severely restricts the type and amount of food/drink ingested, there is an after-meal spike in blood glucose that silently inflicts cellular damage. In those with higher after-meal glucose surges, the damage translates into increased risks of disorders associated with prediabetes. This includes micro-vascular complications such as neuropathy (burning feet), retinopathy (vision loss), and kidney impairment.

Prediabetic glucose surges also increase macro-vascular damage that results in coronary and cerebral artery disorders that cause heart attack and ischemic stroke.
In a 2019 published study, 250 mg of a polyphenol-rich clove extract, taken daily after lunch, significantly reduced after-meal glucose spikes in healthy and pre-diabetic people. After-meal glucose spikes are closely associated with cardiovascular disease.

The extract also lowered pre-meal sugar levels in prediabetics, protecting them from chronic blood sugar elevations that can lead to type II diabetes.

But clove extracts didn’t lower pre-meal sugar levels in prediabetics, protecting them from chronic blood sugar elevations that can lead to type II diabetes.

Taking a daily 250 mg clove extract before a meal with the most starches or sugars has the potential to help maintain healthy glucose metabolism.

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


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1 bottle $30
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**Find SUGAR Balance**

**NEXT-GENERATION Glucose-A1c Management**

**Glycemic Guard™** contains 250 mg of polyphenol-rich clove extract and 200 mg of maqui berry extract. These plant extracts help maintain healthy after-meal blood glucose and A1c levels.

Suggested dose is one capsule a day taken before the highest carbohydrate meal of the day.

- Item # 02122 • 30 vegetarian capsules
- 1 bottle $31.50 • 4 bottles $28 each

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

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As baby boomers age past 65 years, record total numbers are afflicted with dementias that cause loss of mental faculties.

Alzheimer’s, Parkinson’s, and mild cognitive impairment are all associated with brain aging.

While these disorders have different causes, new studies reveal one factor that can contribute to them all—a high blood level of homocysteine.

Excess homocysteine has long been associated with poor cardiovascular health.

Recent research shows that by impeding brain blood flow and inflicting cell damage, homocysteine contributes to cognitive deficits and various forms of dementia.

The solution is simple.

Check homocysteine levels with a blood test.

If elevated, add more bio-active B-vitamins to your supplement program.1,2
Homocysteine and Degenerative Brain Aging

The link between high homocysteine blood levels and increased Alzheimer’s and vascular dementia risks was demonstrated 20 years ago. Since then, clinical studies continue to reveal that homocysteine contributes to degenerative brain aging. In 2018, using two decades of data, a group of experts published an international Consensus Statement in the Journal of Alzheimer’s Disease. They concluded that elevated homocysteine is:

“…a modifiable risk factor for development of cognitive decline, dementia, and Alzheimer’s disease in older persons.”

In other words, if we reduce high homocysteine, we’ll likely slow brain aging.

How Homocysteine Speeds Brain Aging

Homocysteine damages the brain via:

- Chronic inflammatory reactions,
- Formation of atherosclerotic plaque that obstructs blood flow,
- Shrinkage of brain areas like the hippocampus that are involved in memory formation,
- Development of the neurofibrillary tangles and beta-amyloid plaque that trigger cell death, and
- Hindrance of normal DNA repair needed for brain cell maintenance.

The link between high homocysteine and vascular dementia has been clear for several years. Vascular dementia arises when blood vessels narrow, leading to diminished blood flow to vital brain areas.

Studies have shown that elevated homocysteine is associated with a 4.2-fold to 10.5-fold increased risk for vascular dementia. New studies published in 2019 also connect homocysteine levels to accelerated brain aging in Alzheimer’s and Parkinson’s diseases. Among their findings:

- Alzheimer’s patients have elevated homocysteine levels that correlate with the degree of cognitive impairment. Higher homocysteine levels are associated with delusion, agitation/aggression, and depression.
- Parkinson’s disease patients with the highest homocysteine levels showed abnormal areas associated with poor brain blood flow.
Homocysteine and Heart Disease

Back in 1981, Life Extension® urged readers to keep homocysteine levels low to protect against heart attack and stroke.

More than 38 years ago, researchers discovered that homocysteine was harmful to the endothelium, the lining of blood vessels throughout the body, impairing the endothelium’s ability to respond to changes in blood flow and pressure.\(^\text{18,19}\)

These injuries accumulate, resulting in the development of inflammatory plaque that reduces, and eventually blocks, blood flow through the vessel. If that vessel is in the heart or brain, a catastrophic heart attack or stroke could occur.

High homocysteine has been identified as an independent risk factor associated with atherosclerosis and its consequences, raising the likelihood of vascular occlusion and sudden death.\(^\text{19,20}\)

One study of more than 3,000 patients with chronic heart disease found that high homocysteine levels were associated with 2.5 times higher risk of coronary events. Each 5 μmol/L increase in homocysteine produced a 25% increase in risk.\(^\text{20}\)

Other studies show that high homocysteine predicts poor outcomes in people who have survived a heart attack or had stents placed.\(^\text{21,22}\)

Impaired endothelial function is especially risky in patients with diabetes, whose vessels already have a tendency to stiffen and form clots because of glucose-induced vessel damage.\(^\text{18}\)

Poor endothelial function caused or worsened by high homocysteine leads to a host of other dangerous problems, including:

- Reduced ability of the heart to create detours around a blocked vessel. This “collateral circulation” is vital in keeping the heart functioning as coronary arteries narrow.\(^\text{23}\)

- Reduced ability to counteract abnormal clotting inside an artery, which increases the risk of occlusive vascular events like ischemic stroke and acute heart attack.\(^\text{24}\)

- Increased arterial stiffness, a contributor to aortic stenosis, coronary artery disease, and ischemic stroke.\(^\text{25}\)

What You Need to Know

- Homocysteine is an amino acid that is normally detoxified by processes that require vitamins B6, B12, B2 and folic acid to work. If there isn’t enough of those compounds, homocysteine can build up.

- High homocysteine is associated with accelerated brain aging and cardiovascular disease. Lowering homocysteine is a priority for disease prevention.

- Getting an annual blood test for homocysteine is vital, especially for those with family histories of dementia, heart disease and stroke.

- Preventing homocysteine buildup or lowering high levels can be accomplished by increasing intake of vitamin B6 (as pyridoxal 5’-phosphate), B12 (as methylcobalamin), folic acid (as 5-MTHF), and B2 (as riboflavin).
Lowering Homocysteine Levels

Homocysteine is easily measured using low-cost blood tests.

Life Extension® advises homocysteine levels below 12 μmol/L, with ideal numbers being under 8 μmol/L.

Conventional reference ranges do not flag a homocysteine problem until blood levels reach 15 μmol/L. Published data reveal those with homocysteine blood levels between 10 μmol/L-15 μmol/L are at greater risk.26-28

The proper combination of low-cost B-vitamins supports two different homocysteine detoxification (removal) pathways in your body.

If your blood test result shows less-than-optimal levels, initiate a B-vitamin regimen based on the degree of homocysteine elevation. In the next column are some B-vitamin dosing suggestions.

Homocysteine-Lowering Nutrients

Since B-vitamins are water soluble, those with stubbornly high homocysteine levels should take B-vitamin supplements twice daily. Here are daily B-vitamin supplement suggestions:

- Folic acid as activated 5-MTHF, 1,000 mcg to 10,000 mcg
- Vitamin B6 as activated pyridoxal 5'-phosphate, 100 mg to 200 mg
- Vitamin B12 as methylcobalamin, 300 mcg to 1,000 mcg
- Vitamin B2 as riboflavin, 25 mg to 100 mg

Retest your blood three months after initiating these supplements to ensure you are achieving optimal homocysteine levels.

(Article continues on page 56.)

Two Ways Homocysteine is Removed from Your Blood

Homocysteine is a byproduct mostly related to ingesting an amino acid called methionine.

Those who eat a lot of red meat often have higher homocysteine blood levels that are attributed to the methionine content of red meat.

Homocysteine is detoxified in the body via two independent pathways as follows:

1. Methylation (dependent on folic acid, vitamin B12 and B2) and
2. Transsulfuration (dependent on vitamin B6)

Young people readily convert B-vitamins into active forms that readily metabolize homocysteine.

As we age, however, enzymes in our body needed to transform B-vitamins into their active forms are lost. This is one reason why people who had low homocysteine levels in younger years see homocysteine surge higher as they grow older.

The solution to escalating homocysteine is supplementation with active forms of folic acid (5-MTHF), vitamin B6 (pyridoxal-5' phosphate) and the neurologically-active form of B12 called methylcobalamin.

These forms of B-vitamins do not require enzymatic conversion in your body and are immediately available to detoxify homocysteine.

Synthetic Folic Acid

(Used in most commercial supplements must go through many enzymatic stages before converting to 5-MTHF.)

- Dihydrofolate
- Tetrahydrofolate
- 10-formyl-THF
- 5,10 Methenyl THF
- 5,10 Methylene THF
- 5-MTHF (Active Form of Folate)

(Older people can benefit more by taking active 5-MTHF instead of folic acid.)
Commercial labs like Quest charge up to $227 for a Homocysteine Blood Test. Until November 6, 2019, you can order a Homocysteine Blood Test direct from Life Extension® for $54 and receive a complimentary CBC/Chemistry Profile that includes the following:

**Lipid Profile:**
- Total cholesterol
- Triglycerides
- HDL cholesterol
- LDL cholesterol (calc.)
- VLDL cholesterol (calc.)
- Total cholesterol/HDL ratio
- Estimated Coronary Heart Disease risk

**Blood Sugar:**
- Glucose

**Kidney Function:**
- Uric acid
- BUN (blood urea nitrogen)
- Creatinine
- BUN/creatinine ratio
- eGFR (estimated glomerular filtration rate)

**Liver Function:**
- Alkaline phosphatase
- LDH (lactate dehydrogenase)
- AST (aspartate aminotransferase)
- ALT (alanine transaminase)
- Total protein • Albumin • Globulin
- Albumin/globulin ratio • Bilirubin

**Complete Blood Count:**
- Red blood cell count
- Hemoglobin • Hematocrit
- MCV (mean corpuscular volume)
- MCH (mean corpuscular hemoglobin)
- MCHC (mean corpuscular hemoglobin concentration)
- RDW (red blood cell distribution)
- White blood cell count
- Immune Cell Differentiation Count
- Platelet count

**Electrolytes and Minerals:**
- Sodium • Potassium • Chloride
- Calcium • Phosphorus • Iron

The combined value of these tests exceeds $350 at a commercial lab like Quest. As a reader of this magazine, you can check your homocysteine, plus the additional blood markers included in the comprehensive CBC/Chemistry Profile for just $54.

**Special Offer Ends November 6, 2019.**

To order a Homocysteine Blood Test plus a complimentary CBC/Chemistry Profile for only $54 (LC100061), call Life Extension today at 1-800-208-3444 or order online at www.LifeExtension.com/LabServices

You’ll be sent a list of drawing stations in your area along with a pre-paid requisition. You can walk into the drawing station nearest you at your convenience. You also have free access to our Wellness Specialists to help review your results. Blood test services are available only in the continental United States. Not available in Maryland. Restrictions apply in MA, NY, NJ, RI, and PA.

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Homocysteine is toxic and contributes to changes that increase risks of rapid brain aging and cardiovascular disorders.

Homocysteine tends to elevate with aging as detoxification systems in your body break down.

Low-cost B-vitamins can restore more youthful homocysteine detoxification via methylation and transsulfuration pathways in your body.

The ideal combination of B-vitamins turns on both these homocysteine removal pathways in your body.

Homocysteine can be lowered by increasing intake of: B6 (as pyridoxal 5'-phosphate), B12 (as methylcobalamin), folic acid (as 5-MTHF), and B2 (as riboflavin).

These vitamins help transform homocysteine into non-toxic compounds in your body.

For optimal protection against homocysteine buildup, have your blood tested.

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

References

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Cruciferous Vegetable Extracts

Sulforaphane Releasor (myrosinase)

Optimized Broccoli and Cruciferous Blend is an enteric coated, dual-layer tablet providing:

- **Vegetable extracts** (broccoli, watercress, cabbage, rosemary) in one layer.
- **Myrosinase** in other layer to release sulforaphane in the small intestine.
- **DIM** (di-indolyl-methane) to provide further cell health benefits.

Just one *dual-layered tablet* daily provides potent benefits of fresh young vegetables.

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

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

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Quercetin has demonstrated significant health benefits, but higher doses are often required to achieve optimal results.

A novel phytosome delivery technology markedly increases absorption to deliver more quercetin throughout one’s body.

For daily quercetin supplementation, take just one of the new highly-absorbable Bio-Quercetin Phytosome capsules.

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* Supplier Internal Study. Data on File. 2017

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

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1 bottle $9
4 bottles $8 each
Maintain Youthful

HOMOCYSTEINE LEVELS

FOR BRAIN, HEART, AND HEARING HEALTH

Homocysteine Resist supports healthy levels of homocysteine, an unfavorable amino acid that can increase with normal aging.

Just one daily capsule of Homocysteine Resist provides:

- 5-MTHF (activated folate) 5,000 mcg
- Methylcobalamin (activated vitamin B12) 1,000 mcg
- Pyridoxal 5'-phosphate (activated vitamin B6) 100 mg
- Riboflavin (vitamin B2) 25 mg

Suggested dose: If your daily multi-vitamin contains activated B-vitamins, then take one capsule daily of Homocysteine Resist at a different time of the day.

Item #02121 • 60 vegetarian capsules

1 bottle $19.50
4 bottles $17.50 each

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

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Safely Alleviate 11 Symptoms of MENOPAUSE
Women approaching menopause know about hot flashes.

Hot flashes are one of 11 menopausal symptoms that can last for years.¹⁻³

While menopause occurs at age 51 on average,⁴ a recent study found many women aged 60 to 65 are still experiencing moderate to severe menopausal symptoms.⁵

Another study found that only about 10% of women suffering menopausal symptoms are receiving treatment.⁶

Some women think nothing can be done. Others are concerned about the potential side effects of conventional hormone replacement therapy, including a possible increased risk of breast cancer, stroke, and clotting.⁷

But there is no need for women to suffer in silence anymore. Scientific evidence shows that menopausal women can safely benefit from an extract of Siberian rhubarb, a readily available plant extract that does not require a prescription.

Multiple clinical studies have demonstrated that Siberian rhubarb extract alleviates all 11 recognized menopausal symptoms by as much as 83%, often within just four weeks.⁸⁻¹²

For women who prefer to avoid hormone-based treatments, these findings point to a natural, safe, and effective way to restore well-being during menopausal years and beyond.
How Siberian Rhubarb Works

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

That’s where Siberian rhubarb comes in. The root of this plant is rich in compounds that bind to cell receptors that normally bind to estrogen.9,10,13

By doing this, they trigger beneficial estrogen-like effects throughout the body, helping to relieve menopause symptoms.

Siberian rhubarb extract has been successfully used in Germany since 1993 for treating menopause symptoms.10 To further validate its benefits, scientists conducted a series of controlled, clinical trials to determine the extract’s effectiveness.

Easing All 11 Menopause Symptoms

First, a research team enlisted 109 women who were suffering from multiple symptoms of perimenopause, a stage just before menopause when the ovaries gradually begin to make less estrogen. In this study, women received either a daily placebo or 4 mg of Siberian rhubarb extract.9,11

After 12 weeks, scientists evaluated the women by using the MRS II, a respected scale which rates menopause symptoms. The researchers documented a 54% decrease in total symptom scores and significant improvements in all 11 symptom categories. There were no significant changes among the subjects receiving a placebo, who continued to experience all the same menopause symptoms.9

The 11 Menopause Symptoms

While hot flashes and night sweats are the most well-known menopause symptoms, many women suffer from an array of others.

The Menopause Rating Scale, or MRS, was developed in 2004 as a way of evaluating all of these symptoms.

It allows women to rate 11 separate symptoms, graded in severity from 0 (the symptom is not present) to 4 or to 5 (“very severe”) on the revised MRS II scale.2,3,9

The 11 potential menopause symptoms are:

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

Having even one of these symptoms can lead to a significantly lower quality of life.
A similar study of 112 perimenopausal and symptomatic women found virtually identical results. After 12 weeks, patients receiving a placebo had no significant changes. But women getting 4 mg of Siberian rhubarb extract daily showed:12

- A decrease of 54% in overall MRS scores,
- Significant improvements in all MRS symptom categories, and
- An 83% reduction in the median number of daily hot flashes.

By comparison, conventional hormone therapy was found, in a review of 24 placebo-controlled trials, to reduce the frequency of hot flashes by about 75%. In other words, Siberian rhubarb extract improved hot flashes as much as, or even more than, conventional treatment.

**Studies Confirm Long-Term Benefits**

Next, investigators set out to validate these results with a larger group over a longer period.

A total of 252 women took part in a study that lasted six months. Notably, this group included women ranging from perimenopausal to postmenopausal, all of whom had concerning symptoms.10

Each of the women took 4 mg of Siberian rhubarb extract daily, and at the end of the study, each of the 11 MRS symptoms was significantly reduced. There was also a 52% decrease in overall MRS (Menopause Rating Scale) scores.10

The study team found that women with the most severe symptoms achieved the greatest overall improvements. In general, the most commonly improved symptoms were:10

- Hot flashes/sweating,
- Sleep problems,
- Irritability, and
- Depressed mood.

But menopause symptoms can last for years. So researchers set out to study whether this extract would be effective over a significantly longer term.

For a period of 96 weeks scientists conducted a follow-up study.8 Women who had been taking the Siberian rhubarb in a previous, double-blind clinical trial were asked to continue supplementing, while the previous placebo group was asked to now start taking the Siberian rhubarb extract.

**Menopause Relief**

- Multiple, controlled, clinical studies have demonstrated that Siberian rhubarb extract substantially reduces the 11 most important menopausal symptoms, including hot flashes and sleep problems, without any significant safety issues.
- Siberian rhubarb extract has been used in Germany since 1993 to safely treat menopause symptoms.
- Women taking Siberian rhubarb extract can expect broad improvements in mood-related menopause symptoms that are not well-treated by conventional therapies, including depression and irritability.
After switching to the Siberian rhubarb, the former placebo group rapidly caught up to the supplementing test group. At the end of 96 weeks, they demonstrated identical results of a median 83% decrease in total MRS II scores. What’s more, hot flashes decreased from about 15 a day to an average of less than 1.4 a day.

**Improving Mood**

Some of the most troubling menopause symptoms are mood-related: depression, anxiety, and irritability. Although conventional hormone treatments address hot flashes and night sweats, they have not proven effective for improving mood symptoms. In fact, some evidence suggests they may even aggravate them.

Not Siberian rhubarb. In a randomized, controlled clinical trial, the extract led to a resolution of or improvement in depressed mood in more than 90% of those taking it.

The group receiving the extract in this study also achieved a 66% reduction in total scores on the Hamilton Anxiety Scale.11

**Why It’s Safe**

No relevant safety issues arose in any of the above studies of Siberian rhubarb extract, which involved more than 400 women in total.

No changes were seen in vital signs, or in breast, vaginal, or endometrial tissues. And from 1993-2014, an average of 6.7 million doses of this extract were sold in Germany every year.

The remarkable safety record of Siberian rhubarb appears to be rooted in the fact that this unique extract preferentially binds to beneficial receptors (ER-beta) while binding only weakly to undesirable receptors (ER-alpha).13,17

Within the body, there are two types of cell receptors to which estrogen normally binds:

- **Estrogen receptor-alpha** (ER-alpha)

  and

- **Estrogen receptor-beta** (ER-beta).

When estrogen lost during menopause is replaced by non-selective hormone drugs, both ER-alpha and ER-beta receptors are activated.

The problem is that these two receptor types tend to be concentrated in different body tissues, and activating them leads to very different results.
Summary

Siberian rhubarb extract is a unique approach to controlling menopausal symptoms, and provides an alternative to hormone replacement therapy.

In clinical studies, including large, long-term trials, a daily dose of just 4 mg of Siberian rhubarb extract significantly relieved the 11 most important menopausal symptoms, including hot flashes, exhaustion, bladder problems, and more.

Bioidentical hormone-replacement therapy can be effective for many women for hot flashes. But rhubarb extract provides an effective option for those interested in broad, non-hormonal relief of all known menopausal symptoms.

These clinical trials with Siberian rhubarb extract show a notable improvement in mood symptoms like depression, a benefit conventional hormone therapy does not provide. And this plant extract has been demonstrated to be safe.

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

References

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Communication about sexual problems with health professionals is often prevented by embarrassment or expectations of bias. Health professionals may fear being inappropriate or at risk for malpractice for mishandling communication about sexual matters with their patients. Yet the various aspects of sexual health and sexual medicine impact important areas of our lives.

The following report contains a review of topics presented at recent conferences by experts in the fields of sexual medicine and sexual health.
**Infertility**

Elizabeth Grill, PsyD (Associate Professor of Psychology, Weill Cornell Medical College, New York City) is concerned with infertility (involuntary childlessness) in couples. According to the U.S. Department of Health & Human Services, in about one-third of infertility cases, male infertility is the problem. Female infertility accounts for another one-third. The remaining cases are caused either by a combination of male and female problems or by unknown causes.\(^1\) Obesity and smoking reduce fertility in both males and females.\(^2-5\) Athletes who take anabolic androgenic steroids to improve their performance and appearance reduce their fertility.\(^6\) Infertility in women accelerates with age from about \(5\%\) at age 25 to about \(50\%\) at age 41.\(^7\)

Infertile couples often exhibit anxiety, depression, or anger, which may be a cause or consequence of the infertility.\(^8\) Couples often feel their masculinity, femininity, or social acceptability is affirmed by their ability to have children, which adds to their distress concerning infertility.\(^9\) In vitro fertilization is an option for some infertile couples, but the procedure is expensive.

**Bacterial Vaginosis**

Sujatha Srinivasan, PhD (Senior Staff Scientist, Fred Hutchinson Cancer Research Center, Seattle) is an authority on bacterial vaginosis, the most common vaginal infection among women of reproductive age.\(^10\) At any given time, about one-third of women have this infection.\(^11\) Symptoms include vaginal discharge, fishy odor, and reduced vaginal acidity. In about half of cases there are no symptoms. Why symptoms occur in some women, but not in others is unknown.\(^12\)

Bacterial vaginosis is associated with an increased transmission and acquisition of sexually transmitted infections.\(^13\)

Douching is a common cause of bacterial vaginosis.\(^14\) Smoking is associated with bacterial vaginosis.\(^15\) Bacterial vaginosis often recurs despite antibiotic treatment, but oral treatment with the probiotic *Lactobacillus crispatus* has been shown to reduce recurrence.\(^16\)

**Effects of Breast Cancer Treatment**

Lisa Larkin, MD (Owner and President of Lisa Larkin MD and Associates, Mariemont, Ohio) treats women dealing with symptoms related to breast cancer treatment. Women with no risk factors for breast cancer have a \(12\%\) lifetime risk of the disease, whereas those with a genetic disposition for the disease are more likely than not to develop breast cancer.\(^17\) Surgical removal of both breasts almost completely eliminates the extra risk of breast cancer caused by genetic predisposition.\(^18\)

Many young breast cancer survivors given chemotherapy develop menopausal symptoms, including vaginal dryness, painful urination, and painful sexual activity.\(^19\) Concern over increasing cancer risk by the use of vaginal estrogens often motivates the use of non-hormonal lubricants, but these lubricants can increase the risk of infection.\(^20\) The Women’s Health Initiative Observational Study showed no increased risk of cancer for women using low-dose estrogens applied as a cream, ring, or tablet directly to the vagina.\(^21\)
**Erectile Dysfunction**

Sharon Parish, MD (Internal Medicine, Weill Cornell Psychiatry Specialty Center, White Plains, New York) gave a presentation on erectile dysfunction. By one estimate, the inability to achieve an erection affects 5% of men aged 40 and triples to 15% by age 70.22 Another study showed that erectile dysfunction increases with age, affecting almost 40% of men 70 and older.23 Obesity, physical inactivity, and smoking are among the risk factors for erectile dysfunction.24,25

Phosphodiesterase type 5 (PDE5) inhibitors, such as sildenafil (Viagra®) tend to be more effective in younger than in older men,26 but can have unpleasant side effects.27 Stem cell therapy,24 exercise,28 testosterone,29 and low intensity shockwaves30 may be effective treatments.

**Polycystic Ovary Syndrome (PCOS)**

Andrea Dunaif, MD (Professor of Medicine, Mount Sinai, New York City) is a specialist in polycystic ovary syndrome (PCOS), which she believes should be renamed “metabolic reproductive disorder.” PCOS is the leading cause of missed menstrual periods and infertility in women.31 Women with PCOS are commonly obese and have high blood levels of male hormones (androgens).32 Women with PCOS often experience excessive body hair and difficulty losing weight.33

Weight loss is an effective treatment when it can be achieved. Possible drug treatments include metformin14 and androgen-blockers (including hormonal contraception).35,36 Women with PCOS often report a lack of empathy from their physicians, who may argue with them while not providing useful advice.37

**Older Fathers**

Dolores Lamb, PhD (Vice Chair, Department of Urology, Weill Cornell Medicine, New York City) is concerned about the fact that birth rates for men under age 30 have been declining, whereas birth rates for men over 35 have been increasing. Genetic material (DNA) becomes increasingly fragmented as the age of the father increases.38 On average, the offspring of a 40-year-old father have twice as many genetic mutations as the offspring of a 20-year-old father.39 Miscarriage is more than twice as likely for a father over 55 than for a father under 36.40 Children of older fathers are more likely to suffer from cancer, dwarfism, autism, schizophrenia, and other abnormalities.41

As an aside, Dr. Lamb commented that a woman in her 20s marrying a wealthy man in his 70s is unlikely to refrain from becoming a mother based on this information. In vitro fertilization with screening of embryos could be an option in such cases.42

**Intercourse Pain in Women (Dyspareunia)**

Lindsay Phillips, LMSW (Clinical Social Worker, University of Michigan, Ann Arbor, Michigan) does psychological counseling with women who report pain during intercourse, a condition which affects 10% to 28% of women (different studies have shown different frequencies).43 Just over half of women affected seek medical treatment.44 Most women with the condition continue regular penetrative activities with a sexual partner, motivated by a desire for closeness or fear of losing their partner. Inflammation and certain contraceptives can cause the pain, but often there is no identifiable cause.45

Men are far less likely to have pain during intercourse, and when such pain does occur, it is usually due to inflammation of the prostate or bladder.46
Premature Ejaculation

Ege Can Serefoglu, MD (Associate Professor, Bahceci Health Group, Istanbul, Turkey) is a specialist in the subject of premature ejaculation. Men typically ejaculate between four to eight minutes after sexual penetration. Approximately 5% of men ejaculate in less than two minutes after penetration. About 90% of men seeking treatment for premature ejaculation ejaculate within one minute after penetration.

In a few cases there is a readily treatable cause, such as excessive thyroid hormone. Drugs can be effective, but in most cases a combination of psychotherapy and drugs produces the best results, because men who ejaculate prematurely often have emotional problems. Low level of serotonin is the most well-validated cause of premature ejaculation that can be treated with drugs, but patients usually discontinue taking these drugs because of side effects (including a loss of interest in sex). Modafinil, a drug used to treat narcolepsy, has shown better results.

Sexual Assault

Andrea Holmes, MD (Forensic Medical Examiner, Galway Sexual Assault Treatment Unit, Galway, Ireland) examines rape victims for evidence of assailant DNA and administers contraceptives and medications to prevent sexually transmitted disease. An estimated 17%-25% of women and 1%-3% of men have been sexually assaulted in their lifetime. Women are more likely to report being raped than men. Of women rape victims, 16% to 25% report the incident to police, up to 30% contract a sexually transmitted disease, and 5% become pregnant. Rape by a stranger is more likely to be reported, although this is only a small proportion of all rapes. Rape is the most common cause of posttraumatic stress disorder (PTSD) in women, and PTSD is the most common mental health consequence of sexual violence.

Low Sexual Desire in Women

Brooke Faught, DNP (Clinical Director of the Women’s Institute for Sexual Health, Nashville, Tennessee) counsels women who suffer from distress due to low sexual desire. Nearly 40% of women in the United States report low sexual desire, but in only 12% of cases is this accompanied by distress. The most common cause of distress is feeling “less connectedness” with a partner. In general, sexual desire in women tends to decrease with increasing age, but associated distress also decreases with increasing age.

Menopause not only reduces estrogen and progesterone hormones, but androgens as well (reducing sexual desire). Postmenopausal women receiving testosterone as part of hormone replacement therapy show improved sexual function and reduced cancer risk. Intermediate rather than high doses of testosterone produce the best results. Excessive body hair was the major complaint of the women receiving the testosterone. The hormone oxytocin, available from compounding pharmacies, may also be beneficial.

... Fewer than 25% of people will seek help from a health professional for sexual problems
Concluding Remarks

Poor communication or lack of communication with health care professionals is a recurring theme in sexual medicine. According to one survey, fewer than 25% of people will seek help from a health professional for sexual problems.6

In 2017, female students enrolling in American medical schools outnumbered males for the first time in the history of American medicine. Lack of understanding of and empathy for women’s medical problems was characteristic of medicine when the profession was almost entirely dominated by men. A greater proportion of female physicians may result in better communication of sexual problems by women.

More generally, health problems that are sexual are often taken too personally. Shame, guilt, and fear over sexual health issues that could potentially be treated can cause those problems to become chronic physical and psychological wounds.

It is my hope that this report will encourage people to have the courage to be more open about sexual issues, resulting in greater resolution of those problems.

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.
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There’s a traditional saying that goes, “Youth is wasted on the young.”

People are living longer due to medical procedures, drugs, and other treatments, but they’re often too sick to really enjoy the wisdom that comes with age.

“We’re living longer, but we’re not living better,” said world-renowned heart surgeon Dr. Steven Gundry. “This is another paradox of aging.”

But it doesn’t have to be that way. In his latest book, The Longevity Paradox, Gundry outlines his plan for extending both lifespan and healthspan, and it all centers around one thing: bacteria.

Your gut microbiome contains bacteria (“gut buddies,” as Gundry calls them) that impact everything from your weight and the appearance of your skin, to autoimmune disease, heart disease, and cancer.

“As a heart surgeon, I have done my part to extend the lives of tens of thousands of individuals. I’m proud of the fact that I’ve helped so many people live longer lives,” said Gundry. “But I quit my job as professor and head of cardiothoracic surgery at Loma Linda University School of Medicine when I learned that much of what I’d been taught about health and longevity—information that many leading doctors still believe is true—was simply wrong.”

Now, Gundry treats his patients with a combination of conventional medicine and nutritional therapy that focuses on strengthening the gut microbiome. He’s developed a unique program designed specifically with the gut in mind that he’s used successfully with thousands of his patients.

“Over and over I’ve seen incredible results,” Gundry said. “When my patients treat their gut buddies right, they are able to dramatically increase their lifespans.”

More importantly, they’re healthier, too. Gundry has seen his patients “age in reverse,” as they’ve improved their heart health, slowed or reversed the progression of cancer and dementia, and even resolved autoimmune diseases like multiple sclerosis and lupus.

Now, in The Longevity Paradox, Gundry maps out the same plan he’s successfully used with his patients. This Longevity Paradox Program includes a detailed list of foods to eat and ones to avoid, meal plans, and recipes, while also teaching you how to implement strategies like “brain washes.”

In this interview with Life Extension®, Gundry explains how bacteria can have such a big impact on your health and shares key tips from his Longevity Paradox Program.

By utilizing these practical tools, you’ll be arming yourself with the same anti-aging weapons Gundry has shared with so many of his patients with one simple goal in mind: To die young at a ripe old age.

—Laurie Mathena
A recent study from the China Institute collected and analyzed gut bacteria from more than 1,000 healthy Chinese participants ranging in age from three years to over 100. They found that a healthy gut is a key indicator of individuals who live past age 100.

LE: What role does the gut microbiome play in the body?

Dr. Gundry: The inhabitants of your gut microbiome are quite busy day and night. They are involved with regulating major aspects of your immune system, your nervous system, and your hormonal (endocrine) system around the clock. But perhaps their most important role is in supporting your digestive system. Your gut buddies digest the foods you eat and manufacture and deliver vitamins, minerals, polyphenols, hormones, and proteins to where they are needed in your body.

For years we had no idea how important the gut microbiome was for digestion, let alone the manufacture of vitamins and hormones.

Now we know that if the bacteria in your gut can’t process the food you eat, you don’t benefit from the nutrition or the information in that food, no matter how good for you it may be.

LE: How do bacteria specifically impact, say, your brain?

Dr. Gundry: From those seemingly innocuous “senior moments” to more serious neurological conditions such as Parkinson’s disease, dementia, and Alzheimer’s disease, all cognitive decline stems from the same root cause: neuroinflammation. And where does inflammation start? In the gut.

Research on mice clearly shows that certain changes to the gut microbiome lead to neuroinflammation and therefore, cognitive decline. Even in humans, we can see how specific bacterial populations contribute to Alzheimer’s disease. When my colleagues looked at the gut biomes of patients who were cognitively impaired and compared them to the bacteria in patients without such impairments, they found that the cognitively impaired group had an abundance of proinflammatory bad bugs and a reduction in anti-inflammatory gut buddies.

LE: What steps need to be taken to ensure healthy gut bacteria?

Dr. Gundry: When it comes to your gut bacteria, you have two priorities. First, you need to make the good ones so happy that they’ll want to stick around and keep their home lovely and well cared for and make the bad ones so unhappy that they’ll flee the premises for good. This will give you the ideal population and diversity of gut buddies that you need for a long lifespan and healthspan.
Second, it’s just as essential to have a strong gut lining, which I and other researchers refer to as the border or mucosal barrier, to keep those gut buddies where they should be (in your intestinal tract) so they can protect you from foreign invaders and avoid being mistaken for invaders themselves.

LE: What are some of the biggest threats to a healthy microbiome?

Dr. Gundry: The compounds that create the most problems for your gut buddies are called lectins. They are a type of “sticky protein” that plants produce as a defense against being eaten.

Over the last 50 years or so, things have gotten much, much worse for your gut buddies as humans have largely abandoned traditional methods of eating and preparing lectin-rich foods, such as soaking and fermenting, opting instead for quick, cheap options. Our diets have changed more rapidly over the last half century than ever before in history. We now eat far more [lectin-rich foods such as] wheat, corn, and other grains, as well as soybeans—often in the form of processed foods—than unprocessed foods such as leafy greens and other vegetables.

During this same time period our food system has been compromised by an onslaught of herbicides, biocides, drugs, fertilizers, and food additives. And chemicals from personal care products, factory-produced furniture, and household cleaners have invaded our homes. There is simply no way for your gut buddies to catch up and adapt to all of these changes so quickly. And that chemical overload, along with drastic changes to our diet, is sending our gut buddies away in droves and making it possible for the bad guys to take over.

LE: You mentioned having a strong gut lining. Why is this so important?

Dr. Gundry: Having the right gut buddies in your gut microbiome is only half of the equation. The second half is making sure they stay on their side of the intestinal border. When pieces of their cell walls called lipopolysaccharides (LPSs) cross the border from your gut to your organs, tissues, lymph, or blood, it doesn’t matter if they’re gut buddies or bad bugs. Any bacteria, LPSs, or other invaders lurking where they don’t belong trigger an immune response that generates widespread inflammation and lays the groundwork for accelerated aging and illness. This is the definition of “leaky gut.” A strong, impermeable barrier is the key to avoiding many of the diseases we associate with “normal” aging.

LE: Do lectins impact the gut lining as well?

Dr. Gundry: Lectins pry apart the tight bonds between the mucosal cells that line your intestinal wall. Once across the border, these foreign proteins are recognized as foreign by sophisticated bar-code scanners called toll-like receptors (TLRs) located on your immune cells, especially your T cells. Off go the air-raid sirens, an all-points bulletin is called out, and the race is on for the cops to apprehend these interlopers! Now, imagine this happening every minute of every day, and presto—chronic inflammation!

LE: Lectins clearly are a major threat to gut health, but it seems difficult to avoid them completely. Is there a way to protect yourself?
Dr. Gundry: Despite our best efforts, we all sometimes find ourselves in situations in which we must—or we accidentally—eat foods that contain major amounts of lectins. The good news is that there are a number of helpful lectin-absorbing compounds on the market.

You could take glucosamine and methylsulfonylmethane (MSM) in tablet form, which bind lectins. Also consider taking D-mannose in a dose of 500 mg twice a day, particularly if you are prone to urinary tract infections.

LE: You designed your Longevity Paradox Program to restore a healthy gut microbiome and help maintain the integrity of the gut wall. What are some of the key elements of this program?

Dr. Gundry: Some elements of the Longevity Paradox Program may be familiar, such as eating lots of certain vegetables and getting the right amounts of exercise and sleep, while others, such as tricking your body into thinking it’s winter year-round to stimulate your stem cells and spacing out your meals to “wash” your brain at night, are brand new.

Exposure to cold temperatures stimulates your gut buddies to produce more of two beneficial neurotransmitters, GABA and serotonin, both of which help extend lifespan. To take advantage of these benefits, I recommend taking a daily “Scottish shower.” This may not sound like fun, but it will certainly wake you up in the morning and force your body to stay energized and activated throughout the day. To do so, start your shower with warm water as usual and then gradually cool the water down. By the last couple of minutes of your shower, you should be running nothing but cold water. I promise you’ll get used to this fairly quickly.

LE: What about the brain wash?

Dr. Gundry: Deep sleep is when your glymphatic system “washes” your brain, scrubbing it of junk and debris so it doesn’t build up an accumulation of the amyloid plaques that can eventually lead to Alzheimer’s and other neurodegenerative diseases. I have incorporated a “brain wash” day into the Longevity Paradox Program. Once a week (or more), when it is convenient for you, you will skip dinner to make sure your blood can flow freely to your brain as soon as you fall asleep.

LE: What results have you seen with the Longevity Paradox Program?

Dr. Gundry: These strategies have helped my patients lower their blood pressure and cholesterol markers, significantly reduce symptoms of arthritis and other joint issues, resolve MS, lupus, and other autoimmune conditions, improve heart health, and slow or reverse the progression of cancer and dementia—not to mention lose weight and look decades younger!

If you follow my plan, within just a few weeks you’ll have more gut buddies and far fewer squatters, and you’ll start to see and feel a difference in your energy levels, in your lack of symptoms of many of the most common diseases of aging, on your skin, and on the scale.

As Hippocrates famously and wisely said, “All disease begins in the gut.” The good news is that all disease can be stopped there as well.
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References
Dr. Christopher Mohr has spoken on health, nutrition, and fitness at the White House and the Central Intelligence Agency, to major corporations like Under Armour® and Deloitte, and on television programs like The Talk.

He’s also worked as the consulting sports nutritionist for the National Football League’s Cincinnati Bengals.

But despite the wide range of audiences, Mohr says that most people need the same overall message when it comes to improving their health. And he is passionate about bringing that message to aging individuals—not just to help them live longer—but to help them enjoy every minute of their longevity.

In the process, Mohr has built his passion for helping people into a wellness empire, with a message that has reached tens of thousands of individuals from all walks of life, in nearly 50 states and in more than 10 countries around the world.
Long before he started helping people transform their lives, Mohr went through his own transformation. As a boy in middle school, Mohr loved playing football. But by the time he reached eighth grade, he was over the weight limit to play, and he had a decision to make: lose weight or don’t play.

It was an easy decision for Mohr. “The process of losing 20 pounds got me interested in fitness and nutrition,” said Mohr. “I started reading fitness magazines. And when it came time to apply for college, the only thing I was interested in was nutrition.”

That initial interest has shaped Mohr’s career. He went on to get a Master of Science in Nutrition from the University of Massachusetts, and a PhD in Exercise Physiology from the University of Pittsburgh.

Early in his career, Mohr wrote a column for Men’s Fitness Magazine, he also wrote for Discovery Health’s medical TV program, and currently he is on the Men’s Health Advisory Board.

But it wasn’t until he met his wife that their business, Mohr Results, really took off.

Named one of the top weight loss doctors in the country by Prevention Magazine, Dr. Kara Mohr also earned a PhD in Exercise Physiology from the University of Pittsburgh. She was a professor, teaching at the University of Louisville, before leaving to join forces with Chris.

This dynamic duo started and ran the number one fitness bootcamp in Louisville, Kentucky, for six years. During that time, they reached nearly 1,000 women, helping them take control of their health. Then the couple turned their attention to coaching and speaking to larger groups around the world.

“Together we have a unique combination of exercise physiology, nutrition, and behavior change—three pillars that make for a nice complement for helping people make sustainable lifestyle changes,” said Chris Mohr.

More Movement

Whether he is speaking to an audience in London or having a one-on-one in your living room, Mohr’s message on fitness boils down to this: Do what you love and what is realistic for your abilities—and do just enough exercise to get the result and no more.

“Most people don’t have an hour or two to spend at the gym every day. I know I don’t,” he said. “I can talk until I’m blue in the face about the benefits of resistance training, but if you have zero interest in that, you’re not going to do it.”

Instead, Mohr says to start by including more movement throughout the day—like using the bathroom upstairs when you’re downstairs, and parking farther away from the entrance at the supermarket.

“These activities can sound so basic, and it’s easy to discount them,” said Mohr. “But added together, those simple things help so much because the more you do, the more you’ll be able to do. I want you to move as much as possible, then exercise just as much as you need. Movement and exercise are different.”

In addition to achieving your own personal goals, one of the biggest benefits to moving on a regular basis is getting more energy.

“When you get your blood flow going, and when you fuel your body a little bit better, you’ll regain much of the energy that you had when you were younger,” said Mohr. “The best part is that you don’t have to overhaul your entire lifestyle to achieve these results.”

Lessons from the Blue Zones

“Fitness keeps you young,” said Mohr. “It is what allows you to not just live a long life, but to be able to enjoy it. Nutrition is equally important. What you put in your body is what you will get out of your body.”

Mohr doesn’t recommend fad diets or getting caught up in the latest trends. Instead, he advocates following a basic Mediterranean-diet lifestyle that includes lots of color from fruits and vegetables, as well as lean protein and grains.

These recommendations are based on the latest science and follow the example of people who live in the areas of the world where people live longest: the blue zones.
There are five blue zones, where communities of people routinely live to be older than 100. When evaluating the habits of these centenarians, researchers have found that many follow a Mediterranean-style diet.

For example, the individuals living in Ikaria, Greece, an island eight miles off the coast of Turkey, have some of the lowest rates of middle-aged mortality in the world. Researchers attribute this longevity to their diet, which is rich in fruits, vegetables, and healthy fats, and low in dairy, meat, and sugar.

And in the Ogliastra mountain region of the Italian island of Sardinia, which boasts the highest concentration of centenarian men in the world, people regularly consume a diet rich in home-grown fruits and vegetables, cheese that comes from grass-fed sheep, and goat’s milk.

But diet isn’t the only factor in these societies’ longevity.

“The other huge component is the social aspect,” Mohr said. “A huge benefit that keeps popping up is the connection among people. Older people can often lose community and connection. They retire, and don’t feel like they have a purpose anymore.”

The centenarians living on the Nicoya Peninsula of Costa Rica are a perfect example of the benefits of staying connected. Next to Sardinia, Nicoya has the second highest population of male centenarians, and in this case, their longevity is attributed to their strong faith communities and deep social networks.

**The Key to Lasting Change**

“At the end of the day, you can make the changes, but if you don’t have the behaviors to support them, you won’t maintain them long-term,” said Mohr. “Otherwise it’s like a New Year’s resolution.”

Defining your “why” is a key step in creating sustainable change in your life, he explained. “You have to dig down to how someone feels. Rather than wanting to weigh a specific weight, or even wanting to lower your risk of heart disease, you have to identify why.”

For example, do you want to lose weight so that you’ll have more energy to play on the floor with your grandkids? So that you can join the local pickleball league? So that you can be more active during retirement with your spouse?

“Each of us has our unique why,” said Mohr. “It’s something that makes it tangible to you.”

**Taking a Peek Inside Your Body**

Many trainers emphasize how the outside of your body looks, but Mohr stresses that what’s going on inside is as important—or more.

“You might know your body weight, but what’s going on with your cholesterol, your hormones, or your vitamin D levels?” he said.

That’s why, in addition to teaching his clients about proper nutrition, Mohr recommends blood panel tests available through Life Extension®.

“Everything we’ve talked about is great for your physical health, but you don’t know what’s going on inside your body unless you test it,” he said. “The blood panel test is a very simple way to get a comprehensive assessment that will let you know if there’s something you need to work on.”

Most doctors test for markers such as cholesterol and triglycerides, but the Life Extension® blood panel test is much more comprehensive, evaluating a dozen or more markers (depending on the specific test), such as steroid hormones like testosterone and DHEA-S, prostate markers like PSA, and cardiac markers like C-reactive protein and homocysteine.

Once you know what’s going on inside your body, you can take steps to improve it.

“I start with recommendations around nutrition, exercise, and sleep, since they all have a huge impact on blood panels,” Mohr said. “Then I add in supplements. I call them ‘complements,’ because they should complement a quality diet. Where nutrition may not do all that’s needed, supplements can potentially help effect change.”

But for those of you who don’t have Mohr to personally guide you based on your test results, Life Extension provides free access to trained wellness specialists, who can make recommendations tailored to your individual needs.

**Targeted Health Advice**

When Mohr got his blood drawn for the Male Elite Panel Blood Test, the technician drew 10 vials of blood—far more than a typical blood draw.

The lab technician was curious about this and she asked for more information, including the cost.

“I told her it was about $430, and she was shocked. She said that if you just got vitamin D tested alone, it would cost about $280,” said Mohr. “So, when you consider that this particular test includes more than 28 important measurements, you can see that it’s really cost effective.”

Life Extension works hard to negotiate the best lab test prices for its customers. Regular blood testing is a core ingredient of the Life Extension philosophy of being proactive about your health.
The results of Mohr’s male blood panel test revealed that his vitamin D levels were below optimal, at 34 ng/mL. This is technically within “normal” limits according to current recommendations. But the latest research recommends aiming for levels of 50-80 ng/mL in order to attain vitamin D’s disease-lowering benefits.

“I was surprised by these results because I had been taking 3,000 IUs of vitamin D during the winter months, and I thought I was getting enough sunlight during the summer to get all the vitamin D I needed,” Mohr said. “This test showed me that there’s more I can do to achieve optimal vitamin D levels.”

As a result, he added additional vitamin D to his regimen, which includes omega-3s, a multivitamin, and a whey protein supplement. He plans to have his levels retested after a few months.

“If you get targeted answers, you can choose targeted supplements and not blind recommendations,” said Mohr. “My vitamin D results are the perfect example of that.”

**Getting the Most Out of Life**

Mohr stays active doing resistance training, swimming, and playing tennis. When he’s working from home, upstairs, he walks two floors down to use the bathroom there, in order to get more movement, just like he encourages his clients to do.

“I get in as much movement as I can outside structured exercise,” said Mohr. “During the summer I enjoy playing basketball with my daughters and going for a walk in the evening. Anything to get that movement in consistently.”

The nutrition aspect is equally important. His family follows a Mediterranean-style diet that includes lots of fruits, vegetables, and lean protein, plus plenty of fibrous greens.

“We also stress that it’s not just about what you eat and how much, but about the social aspect,” said Mohr.

That’s why every Friday night he shares a meal with a group of friends.

“Food connects us,” he said. “We see the social benefits from people living in the blue zones, and we try to practice that ourselves.”

These are important lessons Mohr instills in his daughters, and it’s what he teaches his clients as well. After all, “Mohr Results” might be his business, but helping people get the most out of life is his mission.

“At the end of the day, all we have is our body,” Mohr said. “How we take care of it is what’s going to carry us on, not just for living longer, but for having energy and vitality to live a great life, longer.”

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Christopher Mohr, PhD, RD, has a Bachelor and a Master of Science degree in Nutrition from The Pennsylvania State University and University of Massachusetts, respectively. He earned his PhD in exercise physiology from the University of Pittsburgh and is a Registered Dietitian. For more information or to hire Mohr for a speaking engagement, visit www.MohrResults.com.

If you have any questions on the scientific content of this article, please call a Life Extension® Wellness Specialist at 1-866-864-3027.
Mint is commonly found in products like toothpaste, chewing gum, and breath mints, but there is more to this tasty herb than its breath-freshening qualities.

Mint’s use as an herbal medicine dates back to at least 1,000 BC, when the ancient Egyptians used it for its antibacterial properties. More recently, studies have shown that compounds found in mint can have beneficial effects on conditions including nasal congestion, digestion, and memory.

Respiratory Conditions

Menthol, the most abundant compound found in mint, is what gives the herb its signature flavor. Menthol also has numerous health benefits, especially in the area of respiratory disorders. Traditional Chinese medicine has used mint as a treatment for respiratory diseases for hundreds of years. In a study, lozenges containing menthol were found to improve nasal sensation of airflow in people suffering from nasal congestion associated with the common cold.

Digestion

The same compound, menthol, has been shown to help with digestion. In an animal study, giving menthol to rats produced gastroprotective and anti-diarrheal activities. Menthol also has antispasmodic effects that can relieve indigestion and abdominal pain.

Cognitive Benefits

One study showed that people who chew gum with mint as the major active ingredient had higher levels of memory retention and alertness than those who didn’t. In fact, another study showed that simply inhaling the aroma of mint is an effective way to boost memory and mood.

Mint makes a delicious tea and can add a fresh flavor to a variety of salads.

References
AN AUTHENTIC
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**California Estate Organic Extra Virgin Olive Oil** is American grown and lab-tested to be *extremely* high in polyphenols—over **800 mg per kg**—as well as organic, authentic, and unadulterated.

This unfiltered **extra virgin olive oil** is:
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- Made entirely from green olives, **handpicked** to avoid bruising,
- Rich in distinctive and fruity flavor,
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Carnosine is a unique dipeptide that can inhibit glycation throughout the body, thereby helping to slow normal aging processes. Suggested dose is one 500 mg Carnosine cap taken twice daily.

Super Carnosine provides 500 mg of carnosine per capsule along with fat-soluble vitamin B1 (benfotiamine) to further impede glycation reactions.

Mitochondrial Energy Optimizer provides 1,000 mg of carnosine in each four capsule dose along with R-lipoic acid, benfotiamine, taurine, and PQQ to provide broad-spectrum support.

Life Extension® was the first to introduce high-dose (500 mg) carnosine back in 1999.

Life Extension carnosine is available in three different formulas to allow you to customize your longevity program.

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

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These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.
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50 mg, 60 capsules
01689 DHEA (Dehydroepiandrosterone)
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00302 Pregnenolone • 50 mg, 100 capsules
00700 Pregnenolone • 100 mg, 100 capsules
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01469 Triple Action Cruciferous Vegetable Extract with Resveratrol

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24404 Kinoko• Platinum AHCC
00316 Kyolic® Garlic Formula 102
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02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
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02138 ArthroMax® Elite
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01600 Krill Healthy Joint Formula
01050 Krill Oil
00451 MSM (Methylsulfonylmethane)
02231 NT2 Collagen™

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

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02240 Anti-Alcohol HepatoProtection Complex
01651 Calcium D-Glucarate
00550 Chlorella
01571 Chlorophyllin
01922 European Milk Thistle • 60 softgels
01925 European Milk Thistle • 120 softgels
01522 European Milk Thistle • 60 veg capsules
01541 Glutathione, Cysteine & C
01393 HepatoPro
01608 Liver Efficiency Formula
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02398 Comprehensive Nutrient Packs ADVANCED
02364 Life Extension Mix™ Capsules without Copper
02354 Life Extension Mix™ Capsules
02356 Life Extension Mix™ Powder
02357 Life Extension Mix™ Tablets with Extra Niacin
02365 Life Extension Mix™ Tablets without Copper
02355 Life Extension Mix™ Tablets
02092 Once-Daily Health Booster - 30 softgels
02091 Once-Daily Health Booster - 60 softgels
02313 One-Per-Day Tablets
02317 Two-Per-Day Capsules - 60 capsules
02314 Two-Per-Day Capsules - 120 capsules
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00320 Dr. Proctor's Shampoo
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80170 Advanced Hyaluronic Acid Serum
80154 Advanced Lightening Cream
80155 Advanced Peptide Hand Therapy
80152 Advanced Triple Peptide Serum
80140 Advanced Under Eye Serum with Stem Cells
80137 All-Purpose Soothing Relief Cream
80139 Amber Self MicroDermAbrasion
80118 Anti-Aging Mask
80151 Anti-Aging Rejuvenating Face Cream
80153 Anti-Aging Rejuvenating Scalp Serum
80133 Anti-Oxidant Facial Mist Hydrator
80156 Collagen Boosting Peptide Serum
80169 Cucumber Hydra Peptide Eye Cream
80141 DNA Support Cream
80167 Environmental Support Serum
80163 Eye Lift Cream
80123 Face Rejuvenating Anti-Oxidant Cream
80109 Hyaluronic Facial Moisturizer
80110 Hyaluronic Oil-Free Facial Moisturizer
80138 Hydrating Anti-Oxidant Facial Mist
00661 Hydroderm
80103 Lifting & Tightening Complex
80168 Melatonin Advanced Peptide Cream
80114 Mild Facial Cleanser
80172 Multi Stem Cell Hydration Cream
80159 Multi Stem Cell Skin Tightening Complex
80122 Neck Rejuvenating Anti-Oxidant Cream
80174 Purifying Facial Mask
01448 Rejuvenex® Body Lotion
01621 Rejuvenex® Factor Firming Serum
80150 Renewing Eye Cream
80142 Resveratrol Anti-Oxidant Serum
01938 Shade Factor™
02129 Skin Care Collection Anti-Aging Serum
02130 Skin Care Collection Day Cream
02131 Skin Care Collection Night Cream
80166 Skin Firming Complex
02096 Skin Restoring Ceramides
80130 Skin Stem Cell Serum
80164 Skin Tone Equalizer
80143 Stem Cell Cream with Alpine Rose
80148 Tightening & Firming Neck Cream
80161 Triple-Action Vitamin C Cream
80162 Ultimate MicroDermabrasion
80173 Ultimate Peptide Serum
80160 Ultra Eyelash Booster
01220 Ultra Rejuvenex®
00676 Ultra RejuveNight®
80101 Ultra Wrinkle Relaxer
80113 Under Eye Refining Serum
80104 Under Eye Rescue Cream
80171 Vitamin C Lip Rejuvenator
80129 Vitamin C Serum
80136 Vitamin D Lotion
80102 Vitamin K Cream

**SLEEP**

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

**VITAMINS**

01533 Ascorbyl Palmitate
00920 Benfotiamine with Thiamine
00664 Beta-Carotene
01945 BioActive Complete B-Complex
00102 Biotin
00084 Buffered Vitamin C Powder
02229 Fast-C® and Bio-Quercetin Phytosome
02075 Gamma E Mixed Tocopherol Enhanced with Sesame Lignans
02070 Gamma E Mixed Tocopherol/Tocotrienols
01913 High Potency Optimized Folate
01674 Inositol Caps Liquid Emulsified
02244 Liquid Vitamin D3 • 2,000 IU, 1 fl oz
02232 Liquid Vitamin D3 • 2,000 IU, 1 fl oz, mint
01936 Low-Dose Vitamin K2
01536 Methylcobalamin • 1 mg, 60 veg lozenges
01537 Methylcobalamin • 5 mg, 60 veg lozenges
00065 MK-7
00373 No Flush Niacin
01939 Optimized Folate (L-Methylfolate)
01217 Pyridoxal 5’-Phosphate Caps
01400 Super Absorbable Tocotrienols
02234 Super K
02335 Super K Elite
01863 Super Vitamin E
02028 Vitamin B5 (Pantothenic Acid)
01535 Vitamin B6
00361 Vitamin B12
02227 Vitamin C and Bio-Quercetin Phytosome • 1,000 mg, 60 veg tablets
02227 Vitamin C and Bio-Quercetin Phytosome • 1,000 mg, 250 veg tablets
01753 Vitamin D3 • 1,000 IU, 90 softgels
01751 Vitamin D3 • 1,000 IU, 250 softgels
01713 Vitamin D3 • 5,000 IU, 60 softgels
01718 Vitamin D3 • 7,000 IU, 60 softgels
01758 Vitamin D3 with Sea-Iodine™
02040 Vitamins D and K with Sea-Iodine™

**WEIGHT MANAGEMENT & BODY COMPOSITION**

00658 7-Keto® DHEA Metabolite • 25 mg, 100 capsules
01479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
01509 Advanced Anti-Adipocyte Formula
01807 Advanced Appetite Suppress
02207 AMPK Metabolic Activator
01823 CalRduce Selective Fat Binder
01478 DHEA Complete
01738 Garcinia HCA
29754 HCActive Garcinia Cambogia Extract
01292 Integra-Lean®
01908 Mediterranean Trim with Sinetrol™-XPure
01492 Optimized Irvingia with Phase 3™ Calorie Control Complex
01432 Optimized Saffron with Satiereal™
00818 Super CLA Blend with Sesame Lignans
01902 Waist-Line Control™
02151 Wellness Code® Appetite Control

**WOMEN’S HEALTH**

01942 Breast Health Formula
01626 Enhanced Sex for Women 50+
01894 Estrogen for Women
01604 Femmenessence MacaPause®
02204 Menopause 731™
01441 Progesta-Care®
01649 Super-Absorbable Soy Isoflavones
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Clinically Studied.
Industry Leading.

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Item # 00056  $17.96
Jarro-Dophilus EPS® 5 Billion Per Capsule 120 Veggie Caps
Item # 21201  $31.46

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*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.

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