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December 2020

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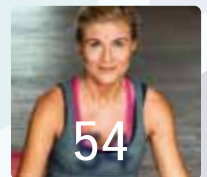
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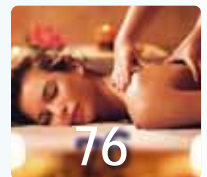
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13. Publication Title		14. Issue Date for Circulation Data Statement	
LIFE EXTENSION		OCTOBER 7, 2020	
15. Extent and Nature of Circulation		Average No. Copies Each Issue During Preceding 12 Months	No. Copies of Single Issue Published Nearest to Filing Date
a. Total Number of Copies (Net press run)		366,071	364,867
b. Paid Circulation (By Mail and Outside the Mail)	(1) Mailed Outside-County Paid Subscriptions Stated on PS Form 3841 (Include paid distribution above normal rate, advertiser's proof copies, and exchange copies)	316,210	348,679
	(2) Mailed In-County Paid Subscriptions Stated on PS Form 3841 (Include paid distribution above normal rate, advertiser's proof copies, and exchange copies)	4,722	5,176
	(3) Paid Distribution Outside the Mails Including Sales Through Carriers and Street Vendors, Counter Sales, and Other Paid Distribution Outside USPS®	41,123	18,895
	(4) Paid Distribution by Other Classes of Mail Through the USPS (e.g., First-Class Mail®)	74	68
c. Total Paid Distribution (Sum of 15b (1), (2), (3), and (4))		362,129	372,818
d. Free or Nominal Rate Distribution (By Mail and Outside the Mail)	(1) Free or Nominal Rate Outside-County Copies Included on PS Form 3841	48,459	10,781
	(2) Free or Nominal Rate In-County Copies Included on PS Form 3841	703	163
	(3) Free or Nominal Rate Copies Mailed at Other Classes Through the USPS (e.g., First-Class Mail)	950	74
	(4) Free or Nominal Rate Distribution Outside the Mail (Carriers or other means)	0	0
e. Total Free or Nominal Rate Distribution (Sum of 15d (1), (2), (3), and (4))		50,112	11,018
f. Total Distribution (Sum of 15c and 15e)		412,241	383,836
g. Copies not Distributed (See Instructions to Publishers #4 (page B2))		59,000	5,000
h. Total (Sum of 15f and g)		471,241	388,836
i. Percent Paid (15c divided by 15h times 100)		87.84%	97.12%

\* If you are claiming electronic copies, go to line 16 on page 1. If you are not claiming electronic copies, skip to line 17 on page 1.

PS Form 3526, July 2019 (Page 2 of 4)



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### Circulation & Distribution

Life Extension • 3600 West Commercial Blvd., Ft. Lauderdale, FL 33309

Editorial offices: 954-766-8433 • fax: 954-491-5306

Customer Service: 800-678-8989 • Email: [customerservice@LifeExtension.com](mailto:customerservice@LifeExtension.com)

Wellness specialists: 800-226-2370 • Email: [wellness@LifeExtension.com](mailto:wellness@LifeExtension.com)

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Letters to the Editor, PO Box 407198, Fort Lauderdale, FL 33340

or email us: [LEmagazine@LifeExtension.com](mailto:LEmagazine@LifeExtension.com)

*LIFE EXTENSION* (ISSN 1524-198X) Vol. 26, No. 12 ©2020 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. LE Publications, Inc. All rights reserved. Published 13 times a year. Subscription rate: \$40 per year in the United States. US \$47 in Canada. US \$60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA. The articles in this magazine are intended for informational purposes only. They are not intended to replace the attention or advice of a physician or other health-care professional. Anyone who wishes to embark on any dietary, drug, exercise, or other lifestyle change intended to prevent or treat a specific disease or condition should first consult with and seek clearance from a qualified health-care professional. LEGAL NOTICE: Health claims contained in articles and advertisements in this publication have not been approved by the FDA with the exception of FDA-approved, qualified health claims for calcium, antioxidant vitamins, folic acid and EPA and DHA omega-3 fatty acids, and selenium as noted where applicable. *Life Extension® Magazine* does not endorse any of the businesses or the products and/or services that may appear in advertisements for non-Life Extension branded products or services contained in it, except to state that they are advertisers who may have paid Life Extension for placement of an advertisement in this publication. Life Extension disclaims any and all responsibilities or warranties as to the accuracy of information contained in advertisements for non-Life Extension branded products or services. For Canadian customers send change of address information and blocks of undeliverable copies to P.O. Box 1051, Fort Erie, ON L2A 6C7.



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# When Drugs Become Dietary Supplements



WILLIAM FALOON

*Politicians pretend to know  
how to make healthcare affordable.  
The realities tell a different story.*

I used to pay **\$340** for an FDA-approved **drug** called **Cerefolin®** that contained:

- **5-MTHF**  
(L-methylfolate) 5,635 mcg
- **Vitamin B12**  
(cyanocobalamin) 1,000 mcg
- **Vitamin B6**  
(pyridoxine) 50 mg
- **Vitamin B2** (riboflavin) 5 mg

I needed this prescription drug to reduce **homocysteine** blood levels. My insurance company refused to pay the outlandish price, so I had to cover it myself.

Move forward a few years and the superior **5-MTHF** form of **folate** became available as a **dietary supplement**. You can now obtain better homocysteine-reducing formulas for less than **\$20** that provide:

- **5-MTHF**  
(L-methylfolate) 5,000 mcg
- **Vitamin B12**  
(methylcobalamin) 1,000 mcg
- **Vitamin B6** (pyridoxal-5-phosphate) 100 mg
- **Vitamin B2** (riboflavin) 25 mg



**5-MTHF** is the activated form of **folate** that supports **methylation** in your DNA. The chart on this page shows the processes required to convert **folic acid** into active **5-MTHF**.

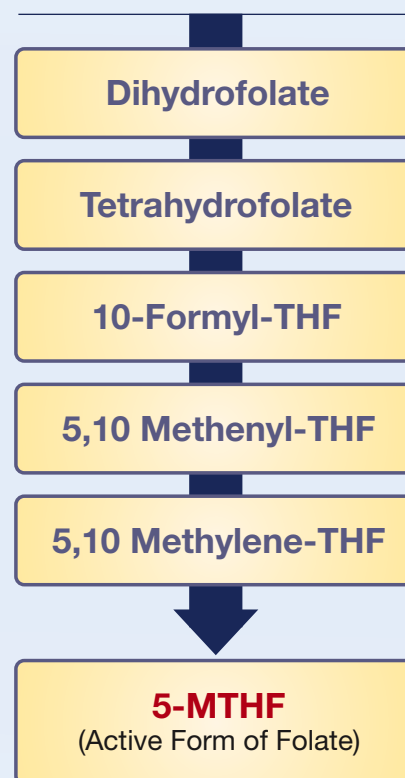
**Pyridoxal-5-phosphate** is the biologically active form of **vitamin B6**.<sup>1</sup>

**Methylcobalamin** is one of the most **active** forms of vitamin B12.

To enlighten **politicians** about slashing **high drug costs**, tell them to reduce the **FDA's** authority and let the public access low-cost generic brands of all off-patent **drugs**—including **nutrients** that should not require a doctor's prescription.

Enzymatic Conversions  
Required to Obtain  
Biologically Active 5-MTHF

## Synthetic Folic Acid



Folic acid found in most supplements must undergo many *enzymatic* processes in your body before converting to its active **5-MTHF** (5-methyltetrahydrofolate) form. Many people are unable to convert folic acid into enough 5-MTHF, which is why supplementing with 5-MTHF (instead of folic acid) makes sense.

In youth, all our body systems are expected to function well all the time.

This changes with aging.

An underlying culprit of degenerative aging is disrupted **methylation**.

Optimal **methylation** enables **youthful** reactions to occur throughout the body, including in our **brain**, **heart**, and critical **liver** detoxification systems.

**Methylation** controls **genes** that must precisely turn “on” and “off” in order to maintain cellular health.

Distorted **DNA methylation** is involved in a host of age-related disorders.

The good news is that **nutrients** most of you take, including activated B vitamins like **5-methyltetrahydrofolate** (5-MTHF), **vitamin D**, and **magnesium** facilitate healthy **methylation**.<sup>2,3</sup>

Measures of **DNA methylation**, called “**epigenetic clocks**,” are today’s premier predictors of **human** longevity.

**Life Extension**® has published many articles about **methylation**, but readers still find it challenging to understand.

According to research in mice, **20%-40%** of age-related changes that are measured by **epigenetic clocks** can be favorably influenced by lifestyle changes such as **calorie restriction**.<sup>4</sup>

Evidence also suggests that, for many people, nutrients such as **5-MTHF** and **methylcobalamin** can favorably influence healthy **methylation** patterns.

### Widespread Methylation Deficits

**Methylation** is an essential process for internal biochemical reactions. With aging, **methylation patterns** become disrupted.<sup>5</sup>

The MTHFR gene is responsible for the activity of the *enzyme* that enables **folate** to be converted into the bioactive form (called **5-methyltetrahydrofolate**) that facilitates healthy **methylation**.

Approximately half the population carries a variant of the **MTHFR** gene that affects the activity of the enzyme, resulting in disrupted DNA methylation.<sup>6,7</sup>

To fulfill its role in maintaining proper **methylation**, folate (or **follic acid**) needs to convert to bioactive **5-MTHF** in the body.

### Methylation Deficits Cause Excess Homocysteine

Homocysteine is an amino acid that, when elevated, has been associated with circulatory and neurological problems.<sup>8</sup> Excess **homocysteine** creates **inflammation** of the endothelium (the inner wall of the arteries) which results in increased cardiovascular risks.<sup>9</sup>

Proper methylation is needed to detoxify homocysteine and reduce high levels of it.

**Age-related** homocysteine increases are often caused by disrupted **methylation**.<sup>10</sup> One reason for homocysteine buildup is that older people do not convert dietary







**folate** or **folic acid** in supplements into biologically active **methyalted folate** (5-MTHF).<sup>7</sup>

The solution is to use the **5-MTHF** form of folate, which is a low-cost **dietary supplement** and no longer an outlandishly priced **prescription drug**.

### Methylation Vital for Gene Expression

The **5-MTHF** form of **folate** is necessary for a compound in the body called **S-Adenosyl-Methionine** (SAdMe) to **meth-ylate** genetic material, including **DNA**.

**Methylation** is a critical way the transcription (activation) of **genes** is controlled. Without proper **methylation**, harmful genes can be overly expressed.

**Epigenetic age** is an emerging scientific concept that involves analysis of **methylation patterns** to determine biological age.<sup>11</sup>

“**Epigenetics**” refers to external modifications that occur in **gene expression** as a result of what we do to our bodies, as opposed to the genetic code we are born with.

**Cigarette smoke**, for example, causes deleterious epigenetic changes to our cellular DNA.<sup>12</sup>

**Vitamin D** and **omega-3** fatty acids, on the other hand, induce beneficial epigenetic effects.<sup>13-16</sup>

Published research shows that measuring **epigenetic age** can predict future disease and mortality.<sup>11</sup>

Scientists have invented tests they call **epigenetic clocks** that have been shown to be accurate predictors of lifespan, healthspan, and all-cause mortality.<sup>17</sup>

We expect to discuss more about **epigenetic tests** in future issues of **Life Extension®** magazine.

### The B Vitamin That Became a Drug

**Vitamin B6** comes in several forms that have shown varying degrees of beneficial effects.

Like folate and B12, **vitamin B6** plays a role in reducing levels of **homocysteine**. It does this via a different **detoxification** pathway than by methylation.<sup>1,8</sup>

**Pyridoxal-5-phosphate** is the biologically active form of B6 that is obtainable today.<sup>1</sup>

**Pyridoxamine** may be a better form of vitamin B6 that is currently unobtainable.<sup>18</sup>

In **1999**, a pharmaceutical company filed an application with the **FDA** to investigate **pyridoxamine’s** ability to treat diabetic nephropathy (kidney disease).<sup>19</sup>

In **2005**, the same company asked the FDA to remove **pyridoxamine** as a supplement.

In **2009** the FDA complied with this drug company’s request.

Eleven years later **pyridoxamine** is not approved either as drug or supplement.

Fortunately, consumers have access to low-cost **pyridoxal-5-phosphate**, which many believe to have comparable benefits to the **pyridoxamine** form of vitamin B6 the **FDA** claims is a “drug.”

### Consumers Won the Big War

For many decades, the **FDA** tried to convert low-cost dietary supplements into **prescription drugs**.<sup>19</sup>

This was done at the behest of pharmaceutical companies who stood to make a fortune charging consumers outlandish **drug prices** for what are low-cost nutrients.

**Life Extension®** initiated a political and legal campaign in the late **1980s** that resulted in passage of the **Dietary Supplement Health and Education Act** in **1994**. This law denies the ability of the FDA to classify most nutrients as drugs and allows truthful, non-misleading health claims.<sup>20</sup>

Consumers won a huge victory **26 years** ago by inundating Congress with letters demanding that the FDA never be allowed to take away their supplements.<sup>20</sup>

This editorial reveals how much money consumers have saved by now paying less than **\$20** for a **B vitamin** formula that cost **\$340** when sold as a **prescription drug**.

For longer life,



William Faloon, Co-Founder  
Life Extension Buyers Club

## References

1. Ueland PM, McCann A, Midttun O, et al. Inflammation, vitamin B6 and related pathways. *Mol Aspects Med*. 2017 Feb;53:10-27.
2. Wessels I. Epigenetics and Minerals: An Overview. *Handbook of Nutrition, Diet, and Epigenetics* 2017:1-19.
3. Beckett EL, Duesing K, Martin C, et al. Relationship between methylation status of vitamin D-related genes, vitamin D levels, and methyl-donor biochemistry. *Journal of Nutrition & Intermediary Metabolism*. 2016;12/01;6:8-15.
4. Unnikrishnan A, Freeman WM, Jackson J, et al. The role of DNA methylation in epigenetics of aging. *Pharmacol Ther*. 2019 Mar;195:172-85.
5. Xiao FH, Wang HT, Kong QP. Dynamic DNA Methylation During Aging: A "Prophet" of Age-Related Outcomes. *Front Genet*. 2019 February-18;10(107):107.
6. Moll S, Varga EA. Homocysteine and MTHFR Mutations. *Circulation*. 2015 Jul 7;132(1):e6-9.
7. Hankey GJ, Eikelboom JW. Homocysteine and vascular disease. *Lancet*. 1999 Jul 31;354(9176):407-13.
8. Selhub J. Homocysteine metabolism. *Annu Rev Nutr*. 1999;19:217-46.
9. Ganguly P, Alam SF. Role of homocysteine in the development of cardiovascular disease. *Nutr J*. 2015 Jan 10;14:6.



## What is Methylation?

**Genes** are stretches of DNA that determine our traits, from hair and eye color to susceptibility to certain diseases and even lifespan potential.

Genes can also be active or inactive. The science of **epigenetics** studies how and why genes are expressed, or not.<sup>21</sup>

One of the main "switches" that modulates the way genes are expressed is **methylation**, which occurs when methyl groups are added to our genetic material.<sup>22</sup>

**SAMe (S-Adenosyl-Methionine)** is a nutrient found naturally in the body that serves as the primary **methyl donor**. That means it's involved in practically *all* methylation reactions.<sup>22-25</sup>

If we don't have enough of it, the body cannot methylate properly. That can lead to excessive oxidative stress, chronic inflammation, tissue damage, and disease.<sup>26,27</sup>

**B vitamins** and **SAMe** offer a way to maintain healthy methylation.

10. Araujo JR, Martel F, Borges N, et al. Folate and aging: Role in mild cognitive impairment, dementia and depression. *Ageing Res Rev*. 2015 Jul;22:9-19.
11. Levine ME, Lu AT, Quach A, et al. An epigenetic biomarker of aging for lifespan and healthspan. *Ageing (Albany NY)*. 2018 Apr 18;10(4):573-91.
12. Kaur G, Bagam P, Pinkston R, et al. Cigarette smoke-induced inflammation: NLRP10-mediated mechanisms. *Toxicology*. 2018 Apr 1;398-399:52-67.
13. Carlberg C. Nutrigenomics of Vitamin D. *Nutrients*. 2019 Mar 21;11(3).
14. Huang Q, Wen J, Chen G, et al. Omega-3 Polyunsaturated Fatty Acids Inhibited Tumor Growth via Preventing the Decrease of Genomic DNA Methylation in Colorectal Cancer Rats. *Nutr Cancer*. 2016;68(1):113-9.
15. Tremblay BL, Guenard F, Rudkowska I, et al. Epigenetic changes in blood leukocytes following an omega-3 fatty acid supplementation. *Clin Epigenetics*. 2017;9:43.
16. Chen L, Dong Y, Bhagatwala J, et al. Effects of Vitamin D3 Supplementation on Epigenetic Aging in Overweight and Obese African Americans With Suboptimal Vitamin D Status: A Randomized Clinical Trial. *J Gerontol A Biol Sci Med Sci*. 2019 Jan 1;74(1):91-8.
17. Lu AT, Quach A, Wilson JG, et al. DNA methylation GrimAge strongly predicts lifespan and healthspan. *Ageing (Albany NY)*. 2019 Jan 21;11(2):303-27.
18. Voziyan PA, Hudson BG. Pyridoxamine as a multifunctional pharmaceutical: targeting pathogenic glycation and oxidative damage. *Cell Mol Life Sci*. 2005 Aug;62(15):1671-81.
19. Available at: <https://www.lifeextension.com/magazine/2009/7/fda-seeks-to-ban-pyridoxamine>. Accessed,
20. Dickinson A. History and overview of DSHEA. *Fitoterapia*. 2011 Jan;82(1):5-10.
21. Dupont C, Armand DR, Brenner CA. Epigenetics: definition, mechanisms and clinical perspective. *Semin Reprod Med*. 2009 Sep;27(5):351-7.
22. Glier MB, Green TJ, Devlin AM. Methyl nutrients, DNA methylation, and cardiovascular disease. *Mol Nutr Food Res*. 2014 Jan;58(1):172-82.
23. Luka Z, Mudd SH, Wagner C. Glycine N-methyltransferase and regulation of S-adenosylmethionine levels. *J Biol Chem*. 2009 Aug 21;284(34):22507-11.
24. Lin H. S-Adenosylmethionine-dependent alkylation reactions: when are radical reactions used? *Bioorg Chem*. 2011 Dec;39(5-6):161-70.
25. Laurino P, Tawfik DS. Spontaneous Emergence of S-Adenosylmethionine and the Evolution of Methylation. *Angew Chem Int Ed Engl*. 2017 Jan 2;56(1):343-5.
26. Rotondo JC, Bosi S, Bazzan E, et al. Methylenetetrahydrofolate reductase gene promoter hypermethylation in semen samples of infertile couples correlates with recurrent spontaneous abortion. *Hum Reprod*. 2012 Dec;27(12):3632-8.
27. Rotondo JC, Selvatici R, Di Domenico M, et al. Methylation loss at H19 imprinted gene correlates with methylenetetrahydrofolate reductase gene promoter hypermethylation in semen samples from infertile males. *Epigenetics*. 2013 Sep;8(9):990-7.



# Taurine



Item #01827 • 90 vegetarian capsules

1 bottle **\$9.75**

4 bottles \$9 each

## Boosts Brain Cell Regeneration & Supports Whole-Body Health

Research has found that taurine can promote **new cell formation** in the area of the brain associated with **learning** and **memory**.

Taurine also enhances **neurites**, tiny projections that help brain cells communicate with each other.

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Low-Cost  
Biologically  
Active

# B COMPLEX

## Enzymatically Active Vitamins

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

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

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

\* *Br J Pharmacol.* 2004 Mar;141(5):825-30.

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.

# SAMe

## FOR HEALTHY METHYLATION

Life Extension® first introduced SAMe in 1997. Since then, researchers around the world have continued to discover its impressive benefits.

While SAMe is largely known for mood support, it has also shown benefits for the liver and joints.

A study by Harvard Medical School and Massachusetts General Hospital cited the impressive benefits of SAMe for mood elevation.<sup>1</sup>

A report published in Germany showed that SAMe may help maintain healthy neurological function. This impressive report found that SAMe:<sup>2</sup>

- Increased glutathione levels by **50%** and glutathione enzyme activity by **115%**,
- Decreased a measurement of free radical activity by **46%**, and
- Inhibited lipid peroxidation by **55%** in culture.

In addition to these findings, SAMe also improves brain cell methylation, thereby facilitating youthful DNA enzymatic actions.

For full product description and to order SAMe, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

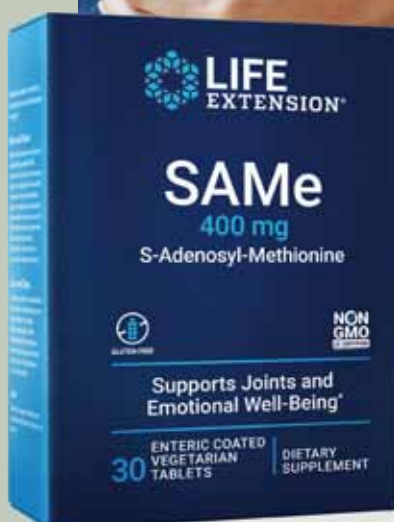
### Item #02176

400 mg, 30 enteric coated vegetarian tablets

1 box **\$27** • 4 boxes \$24 each

### References

1. *Am J Psychiatry*. 2010 Aug;167(8):942-8.
2. *Naunyn Schmiedebergs Arch Pharmacol*. 2000 Jan;361(1):47-52.



(SAMe is also available in boxes containing 30 200 mg tablets. Price is \$18.75. If you buy four, the price is reduced to \$16.50 per box. Item #02175).

**CAUTION:** SAMe should not be taken by those diagnosed with bipolar disorder.



# In the News



## Nutrients Strengthen the Immune System Against Viral Infections

A review published in the *Archives of Physiology and Biochemistry* found evidence for nutrients including protein, vitamins, minerals, and fatty acids, that strengthen the human immune system against viral infections.\*

Fifty-one articles were reviewed, which focused on the effects of nutrients in immunity and viral infections. They included reports of randomized trials, case-control studies, in vivo studies, and randomized-trial meta-analyses.

These studies identified **protein, omega-3 fatty acids, vitamins A, B1, B6, B12, C, D and E, iron, selenium, and zinc** as having a role in strengthening the immune system and supporting immune function.

Among the mechanisms discussed are:

- The role of amino acids in the immune system's antiviral actions,
- Vitamin A's involvement in maintaining mucosal integrity,
- Vitamin C's anti-inflammatory effect in sepsis,
- Vitamin D-associated reduction of viral replication rates and inflammatory cytokine levels,
- Vitamin E's ability to help maintain T-cell membrane integrity, and
- Zinc's ability to impair viral replication.

**Editor's Note:** In some of the studies, nutrient supplementation was associated with improved health status of infected individuals. "Supplementation with some nutrients may support the body's natural defense system by enhancing the immunity, epithelial barriers, cellular immunity, and antibody production," the review's authors wrote.

\* *Arch Physiol Biochem.* 2020 Jul 9:1-10.

## Probiotic Supplementation Can Help Improve Depressive Symptoms

People who have symptoms of depression may benefit from supplementation with probiotics with or without prebiotics, according to a systematic review published in the journal *BMJ Nutrition Prevention & Health*.\*

For their review, the researchers selected seven studies that enrolled a total of 361 men and women. The studies examined the effects of at least one probiotic bacteria strain on anxiety or depression.

“Every study demonstrated a significant, quantitatively evident, decrease/improvement of symptoms and/or biochemically relevant measures of anxiety and/or depression for probiotic or combined prebiotic-probiotic use,” the authors reported.

The authors concluded that the effects of prebiotic and probiotic therapy against depression and anxiety warrant further investigation in larger populations.

**Editor’s Note:** Probiotics are helpful bacteria residing in the intestinal tract that help in digestion and other aspects of health. Prebiotics are nutrients that support the growth of these microorganisms.

\* *MJ Nutrition, Prevention & Health*. 2020:bmjnph-2019-000053.





## Garlic May Benefit Rheumatoid Arthritis Patients

Results from a trial reported in *Phytotherapy Research* revealed improvements in pain, inflammation, tender joint count, disease activity score and fatigue among rheumatoid arthritis patients who were supplemented with **1,000 mg** of garlic daily, compared to patients who received a placebo.\*

The trial included 70 women with active rheumatoid arthritis who received **500 mg** garlic powder tablets twice per day (equivalent to **2.5 grams** fresh garlic) or a placebo for eight weeks.

At the beginning and end of the study, clinical symptoms and fatigue were assessed and biomarkers of inflammation including erythrocyte sedimentation rate, C-reactive protein (CRP), and tumor necrosis factor-alpha (TNF-a) were measured.

At the trial's conclusion, serum CRP and TNF-a were significantly reduced among participants who received garlic in comparison with the placebo group, indicating decreased inflammation. Pain intensity, tender joint count, fatigue, and disease activity scores all improved in association with treatment compared to the placebo.

**Editor's Note:** The authors observed that garlic is rich in bioactive compounds that include allicin and diallyl sulfide, which have been found, in several studies, to have anti-inflammatory effects. Other studies have reported pain-relieving and anti-fatigue benefits in association with garlic intake. Additionally, garlic may help protect against joint cartilage destruction.

\* *Phytother Res.* 2020 Jun 1.



## Passive Stretching is Good for Heart Health

Passive stretching could improve heart health by boosting blood flow, according to a study published in the *Journal of Physiology*.\*

Unlike active stretching, passive stretching involves using an external force, such as gravity or another person, to help achieve a deeper stretch.

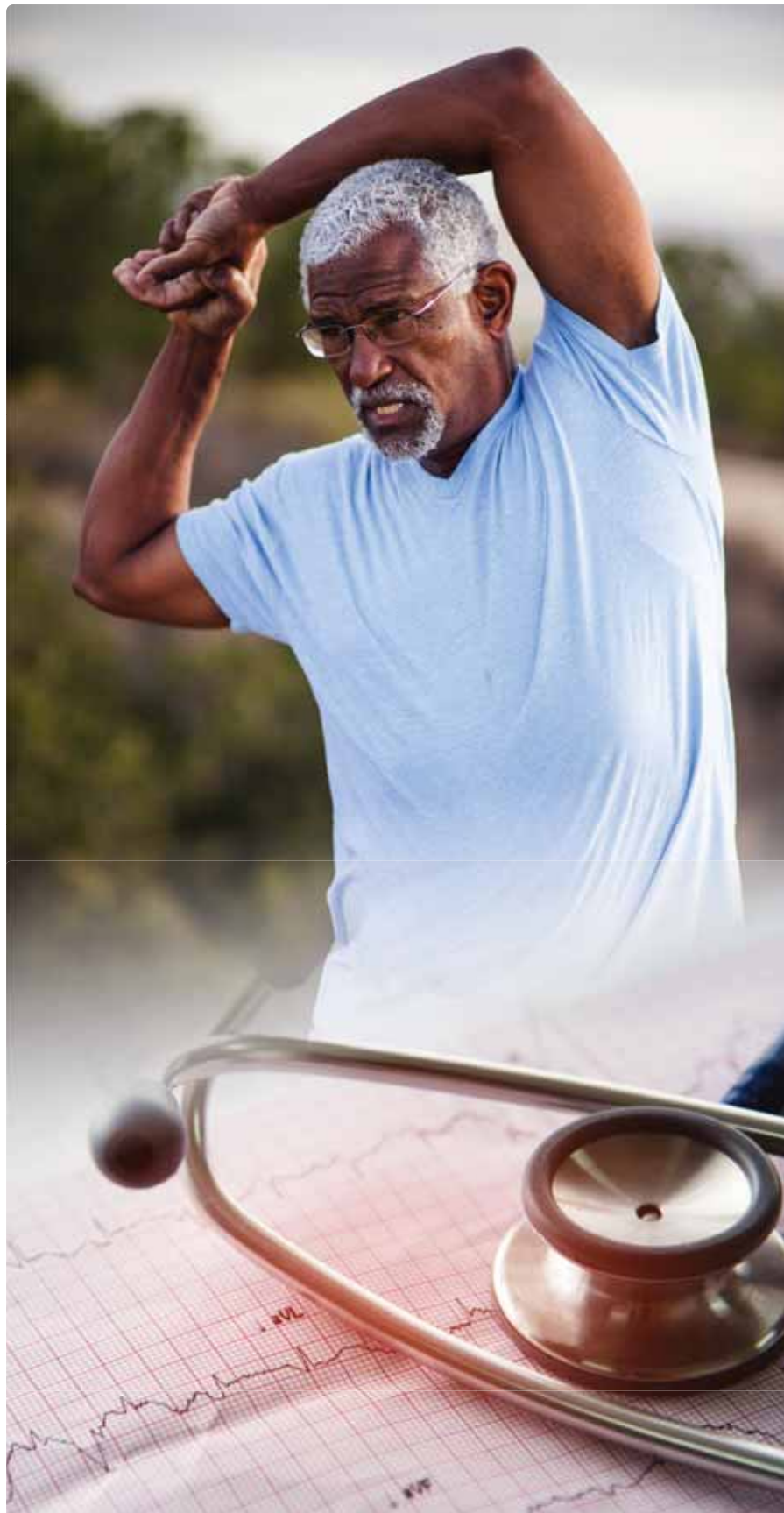
For this study, 39 people were divided into two groups: one that performed leg stretches **five times a week** for 12 weeks, and one that did no stretching.

The researchers found that stretching helped to increase blood flow and dilation—and decreased stiffness—in the arteries in the upper arm and lower leg.

According to one of the study's authors, "This new application of stretching is especially relevant in the current pandemic period of increased confinement to our homes, where the possibility of performing beneficial training to improve and prevent heart disease, stroke, and other conditions is limited."

**Editor's Note:** This study indicates that stretching could potentially represent a drug-free way to improve vascular health and reduce disease risk, as changes in blood flow due to an impaired vascular system are characteristics of diseases such as heart disease, stroke, and diabetes.

\**The Journal of Physiology*, 2020.





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

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

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# Sweet DREAMS

## Choose the Melatonin That's Right For You

Healthy sleep is one of the best ways to feel revitalized and maintain optimal health.

While many people find melatonin helps improve sleep, others take it nightly for its **immune** protection effects.

Individual doses range from **300 mcg** to **10 mg** taken 30-60 minutes before going to sleep.

**Caution:** Consult your health care provider before taking this product if you are being treated for a medical condition (especially autoimmune or depressive disorders). This product is not intended for children, pregnant or lactating women, or women trying to become pregnant. Do not consume alcohol, drive or operate machinery after taking this product.

Sensoril® and Capros® are patent protected and registered trademarks of Natreon, Inc.

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100 vegetarian tablets

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200 vegetarian capsules

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**Melatonin 3 mg**  
60 vegetarian lozenges

Price: **\$6**  
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**Melatonin Timed Release 750 mcg**  
60 vegetarian tablets

Price: **\$6**  
Item # 01788



**Melatonin Timed Release 3 mg**  
60 vegetarian tablets

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Item # 01786



**Melatonin 1 mg**  
60 capsules

Price: **\$3.75**  
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**Enhanced Sleep with Melatonin**  
30 capsules

Price **\$16.50**  
Item# 01551



**Melatonin 10 mg**  
60 vegetarian capsules

Price: **\$21**  
Item# 00331



**Enhanced Sleep without Melatonin**  
30 capsules

Price: **\$16.50**  
Item# 01511



**Melatonin 300 mcg**  
100 vegetarian capsules

Price: **\$5.25**  
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**Melatonin IR/XR**  
60 capsules

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Item# 02201



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Unique Probiotic and Saffron Blend

# Feeling Down?



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Just one capsule daily.

**FLORASSIST®** formula provides clinically-studied ingredients that have been shown to:

- Promote relaxation
- Enhance mood
- Reduce perceived stress

Two **probiotic** strains enhance **signaling** between the digestive tract and brain to support positive mood.

This **probiotic** blend also contains standardized **saffron** that has been shown to significantly improve mood and promote relaxation.

Contains milk, soybeans.



For full product description and to order **FLORASSIST® Mood Improve**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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# Garlic

## SUPPORTS HEALTHY IMMUNE FUNCTION

Science has shown that **garlic**, rich in **allicin**, supports immune function on multiple fronts, for example:<sup>1,2</sup>

- Promotes healthy immune cell function
- Supports immune T cells and immunoglobulin production
- Promotes protective macrophages
- Maintains cellular detoxification
- Modulates cytokine production

Easy-to-take **Optimized Garlic** is standardized to contain 10,000 ppm of allicin potential.



**Item #01394** • 200 vegetarian capsules

1 bottle **\$18.75**

4 bottles \$15.75 each

#### References

1. *J Immunol Res.* 2015; 2015: 401630.
2. *Cytometry.* 2002 Aug 1;48(4):209-15.

For full product description and to order **Optimized Garlic**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)





# Highly Absorbable **ASTAXANTHIN**

**Astaxanthin** is a carotenoid that benefits the brain, heart, skin, and immune system.

Found naturally in seafood and algae, as little as **50%** of **astaxanthin** is normally **absorbed** in the bloodstream.<sup>1,2</sup>

**Life Extension®** combines **4 mg** of **astaxanthin** with a blend of four different **phospholipids**, which has been shown to enhance carotenoid **absorption** by **several-fold**.<sup>3</sup>

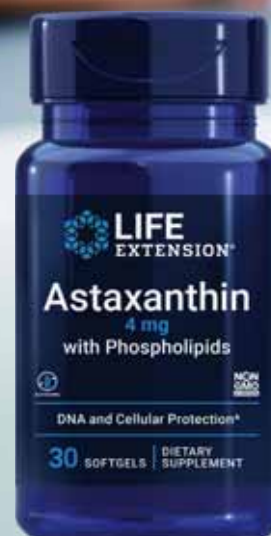
#### References

1. *Mol Nutr Food Res.* 2012 Sep;56(9):1385-97.
2. *Eur J Pharm Sci.* 2003 Jul;19(4):299-304.
3. *Int J Pharm.* 2011 June 30; 412(1-2):99-105.

For full product description and to order  
**Astaxanthin 4 mg with Phospholipids**,  
call 1-800-544-4440 or  
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Item #01923 • 30 softgels  
1 bottle \$12  
4 bottles \$10.50 each







# IMMUNE SUPPORT for Quick Recovery

BY ISSAC RUTNER

Americans suffer from over **one billion colds** each year, an average of more than three per person.<sup>1</sup>

The **flu** is less common but far more severe, killing **tens of thousands** of Americans annually.

Here's the good news: In the *early* stages of a cold or flu, it is still possible to ***change the course of the illness***.

Three immune-supporting nutrients bolster your body's defenses, helping to reduce both the severity and duration of the illness.

In human studies:

- **Zinc** lozenges reduce the **duration** of colds by up to **44%** and the severity of symptoms by as much as **50%** when initiated soon after symptoms first appear,<sup>2</sup>
- **Elderberry** extract resolves upper respiratory symptoms up to **four days earlier** than a placebo,<sup>3</sup> and
- **Vitamin C** can reduce the duration of colds by **9.4%** overall—and by **18%** in children.<sup>4</sup>

**Zinc, elderberry, vitamin C** and other interventions may reduce the impact of cold or flu, helping you recover and get back on your feet faster.

## The Dangers of Cold and Flu

The **common cold** and the **flu** are two of the most frequent causes of acute illness, with no effective medical treatments to cure them.

More than **one billion** cases of cold, a viral infection of the nose and throat, occur in the U.S. each year, typically lasting a week to 10 days.<sup>1,5</sup>

Up to **20%** of Americans contract the flu each year, a more severe viral infection that can lead to serious complications like **pneumonia**.<sup>1</sup>

Annual **flu vaccines** can protect only against two or three strains of flu virus each season, and they do not protect against colds.

## Three Nutrients That Help

Three nutrients have been shown to improve outcomes from cold and flu infections:

- **Zinc,**
- **Elderberry,** and
- **Vitamin C.**

Each has been shown, in clinical trials, to reduce the severity and/or duration of these common infections.

## Zinc Shortens Colds

**Zinc** is a mineral required for the proper function of hundreds of enzymes in the body.

It can reduce the spread of viruses that cause **colds** in a number of different ways.

In order to cause disease, viruses must recognize, bind to, and then enter a host cell.

Zinc appears to coat the receptors that viruses use to bind to cells, preventing them from entering cells.<sup>6</sup> If they can't enter the cells, viruses can't replicate out of control.

A number of trials have evaluated whether these antiviral effects are clinically effective.

An analysis of human studies showed that, when started after the first sign of cold symptoms, taking **80 mg to 92 mg of dissolve-in-the-mouth zinc in divided doses** every few hours **reduces the duration** of symptoms by **25% to 44%**.<sup>2</sup>

In most cases, the severity of symptoms was also reduced, by up to **40% to 50%**.

## Elderberry Fights Viruses

**Elderberries** are small, dark purple berries. They're packed with **anthocyanins**, pigments responsible for their color, which have antioxidant, anti-inflammatory, and antiviral properties.<sup>3,7</sup>

Elderberries have long been used in traditional medicine to treat fevers, infection, and a variety of other ailments. Research has found that they help ward off **viral respiratory tract infections** such as colds and flu.<sup>3</sup>

Scientists determined that elderberry and its extracts have direct **antiviral** effects in cell cultures.<sup>8</sup>

In one study, healthy cells were incubated with the **H1N1 virus**, the virulent form of flu that caused the **1918** Spanish flu pandemic and another outbreak in **2009**. Elderberry *reduced* the number of cells that became infected with the virus.

This happened in a **dose-dependent** manner, meaning that at low doses the elderberry *slightly* reduced the number of infected cells (by about **20%**). At higher doses it prevented **nearly 100%** of the cells from becoming infected.





## WHAT YOU NEED TO KNOW

### Boosting Immunity to Fight Colds and Flu

- **Cold** and **flu** viruses are two of the most common causes of acute respiratory illness.
- Three nutrients—**zinc**, **elderberry**, and **vitamin C**—have been shown to enhance the **immune response** to viral infections and reduce the severity and/or duration of illness.
- Taken for a short course at the first signs of symptoms, a blend of these nutrients may help people recover faster when illness does set in.

These experimental findings have carried over to human studies. A recent analysis of randomized clinical trials found that elderberry extract intake significantly **reduced the duration of illness** in people sick with **flu** or **cold** infections.<sup>3</sup>

In one of these studies, people suffering from upper respiratory symptoms who used elderberry extract had their symptoms resolve **four days earlier** than those taking a placebo.<sup>3</sup>

### Vitamin C Boosts Immunity

**Vitamin C** has long been considered an important nutrient to boost immunity and defend against infection by viruses and other pathogens.

Viral infections often lead to an increased production of **free radicals**, which inflict additional inflammatory damage and increase disease severity.

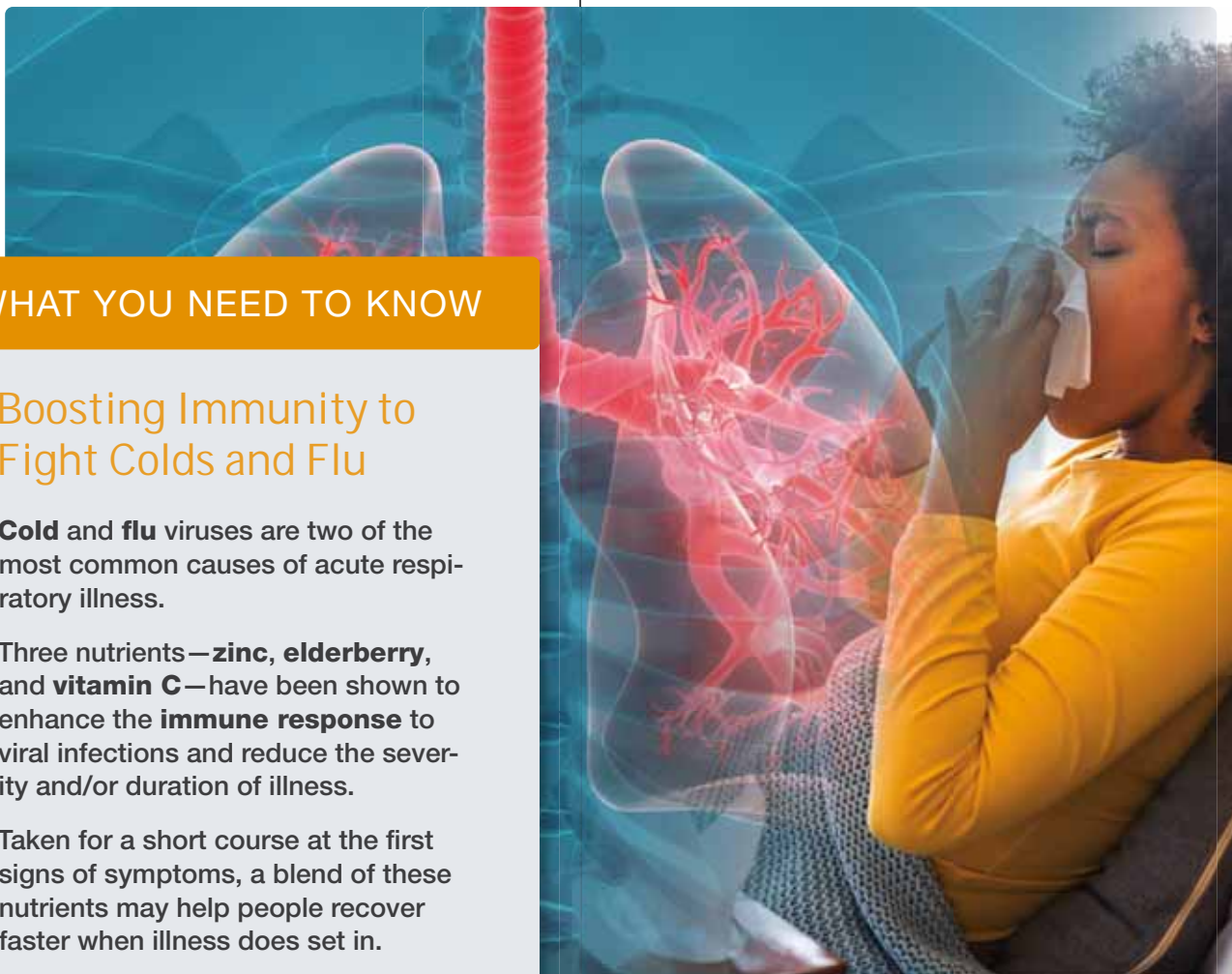
By helping to neutralize excess free radicals, vitamin C helps limit the oxidative damage that occurs and *reduces* the severity of illness.

Vitamin C defends against infection in several ways. For one, it helps to enhance the function of immune cells that fight infection.<sup>9</sup>

Vitamin C also helps increase levels of **interferons**, which are warning *signals* produced by the body that trigger the protective immune mechanisms against viral infections.<sup>9</sup>

Human studies indicate that vitamin C may be effective in treating viral respiratory tract infections. One large analysis that looked at close to **10,000** cases of the common cold found that vitamin C reduced the duration of colds by **9.4%** overall.<sup>4</sup>

When researchers evaluated adults and children separately, they found that the duration of colds was shortened by **8%** in adults and **18%** in children.



Numerous studies using varying dosage regimens have assessed the effects of **vitamin C** in the context of common colds. Some studies show reductions in common cold incidence<sup>10-12</sup> or duration of illness,<sup>4,13,14</sup> while others have concluded that vitamin C supplementation has no or minimal effect.<sup>15-17</sup> Some evidence suggests greater potential for benefit with *higher* vitamin C doses and if supplementation is started rapidly after symptom onset.<sup>18,19</sup>

## Summary

The common **cold** and the **flu** are two of the most frequent **viral illnesses**.

Research has found that **zinc**, **elderberry**, and **vitamin C** help support the immune system and can reduce the *severity* and *duration* of illness.

Each has been found to have immune-response-bolstering properties when taken at the first sign of symptoms of cold or flu. •

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

## References

1. Available at: <https://www.nccih.nih.gov/health/flu-and-colds-in-depth#>. Accessed June 8, 2020.
2. Hemila H, Chalker E. The effectiveness of high dose zinc acetate lozenges on various common cold symptoms: a meta-analysis. *BMC Fam Pract*. 2015 Feb 25;16:24.
3. Hawkins J, Baker C, Cherry L, et al. Black elderberry (*Sambucus nigra*) supplementation effectively treats upper respiratory symptoms: A meta-analysis of randomized, controlled clinical trials. *Complement Ther Med*. 2019 Feb;42:361-5.

4. Hemila H. Vitamin C and Infections. *Nutrients*. 2017 Mar 29;9(4).
5. Available at: <https://medlineplus.gov/commoncold.html>. Accessed September 8, 2020.
6. Hirt M, Nobel S, Barron E. Zinc nasal gel for the treatment of common cold symptoms: a double-blind, placebo-controlled trial. *Ear Nose Throat J*. 2000 Oct;79(10):778-80, 82.
7. Strugala P, Loi S, Bazanow B, et al. A Comprehensive Study on the Biological Activity of Elderberry Extract and Cyanidin 3-O-Glucoside and Their Interactions with Membranes and Human Serum Albumin. *Molecules*. 2018 Oct 8;23(10):2566.
8. Roschek B, Jr., Fink RC, McMichael MD, et al. Elderberry flavonoids bind to and prevent H1N1 infection in vitro. *Phytochemistry*. 2009 Jul;70(10):1255-61.
9. Iqbal K, Khan A, Khan Khattak MA. Biological significance of ascorbic acid (vitamin C) in human health - a review. *Pakistan Journal of Nutrition*. 2004;3(1):5-13.
10. Sasazuki S, Sasaki S, Tsubono Y, et al. Effect of vitamin C on common cold: randomized controlled trial. *Eur J Clin Nutr*. 2006 Jan;60(1):9-17.
11. Kim TK, Lim HR, Byun JS. Vitamin C supplementation reduces the odds of developing a common cold in Republic of Korea Army recruits: randomised controlled trial. *BMJ Mil Health*. 2020 Mar 5;bmj.military-2019-001384.
12. Van Straten M, Josling P. Preventing the common cold with a vitamin C supplement: a double-blind, placebo-controlled survey. *Adv Ther*. 2002 May-Jun;19(3):151-9.
13. Hemila H, Chalker E. Vitamin C for preventing and treating the common cold. *Cochrane Database Syst Rev*. 2013 Jan 31(1):CD000980.
14. Ran L, Zhao W, Wang J, et al. Extra Dose of Vitamin C Based on a Daily Supplementation Shortens the Common Cold: A Meta-Analysis of 9 Randomized Controlled Trials. *Biomed Res Int*. 2018;2018:1837634.
15. Quidel S, Gómez E, Bravo-Soto G, et al. What are the effects of vitamin C on the duration and severity of the common cold? *Medwave*. 2018 Oct 3;18(6):e7261.
16. Gómez E, Quidel S, Bravo-Soto G, et al. Does vitamin C prevent the common cold? *Medwave*. 2018 Aug 6;18(4):e7235.
17. Audera C, Patulny RV, Sander BH, et al. Mega-dose vitamin C in treatment of the common cold: a randomised controlled trial. *Med J Aust*. 2001 Oct 1;175(7):359-62.
18. Bucher A, White N. Vitamin C in the Prevention and Treatment of the Common Cold. *American journal of lifestyle medicine*. 2016;10(3):181-3.
19. Douglas RM, Chalker EB, Treacy B. Vitamin C for preventing and treating the common cold. *Cochrane Database Syst Rev*. 2000 (2):Cd000980.





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**AMPK** is an enzyme in the body that *signals* cells to burn fat for energy.

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

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- **Cordyceps** promotes endurance<sup>4</sup> and enhanced immune function.<sup>5</sup>
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To order **Adrenal Energy Formula**,  
call **1-800-544-4440** or  
visit **www.LifeExtension.com**

## References

1. *J Int Soc Sports Nutr.* 2015;12:43.
2. *Ayu.* 2015 Jan-Mar;36(1):63-8.
3. *Phytother Res.* 2014 Apr;28(4):551-9.
4. *Pharm Biol.* 2014;52(2):157-61.
5. *Evid Based Complement Alternat Med.* 2014;2014:438506.
6. *Indian J Med Res.* 2012 Apr;135(4):548-54.
7. *Nepal Med Coll J.* 2008 Sep;10(3):176-9.

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Humans don't manufacture **vitamin C** internally, so it must be obtained through dietary sources or supplements.

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

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\* PLoS Med. 2005 Sep;2(9):e307;author reply e309.



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ELDERBERRY + VITAMIN C

# Immune Support

Standardized **elderberry** extract helps support immune function.

*Vitamin C* promotes signaling proteins called **interferons** that further support immunity.

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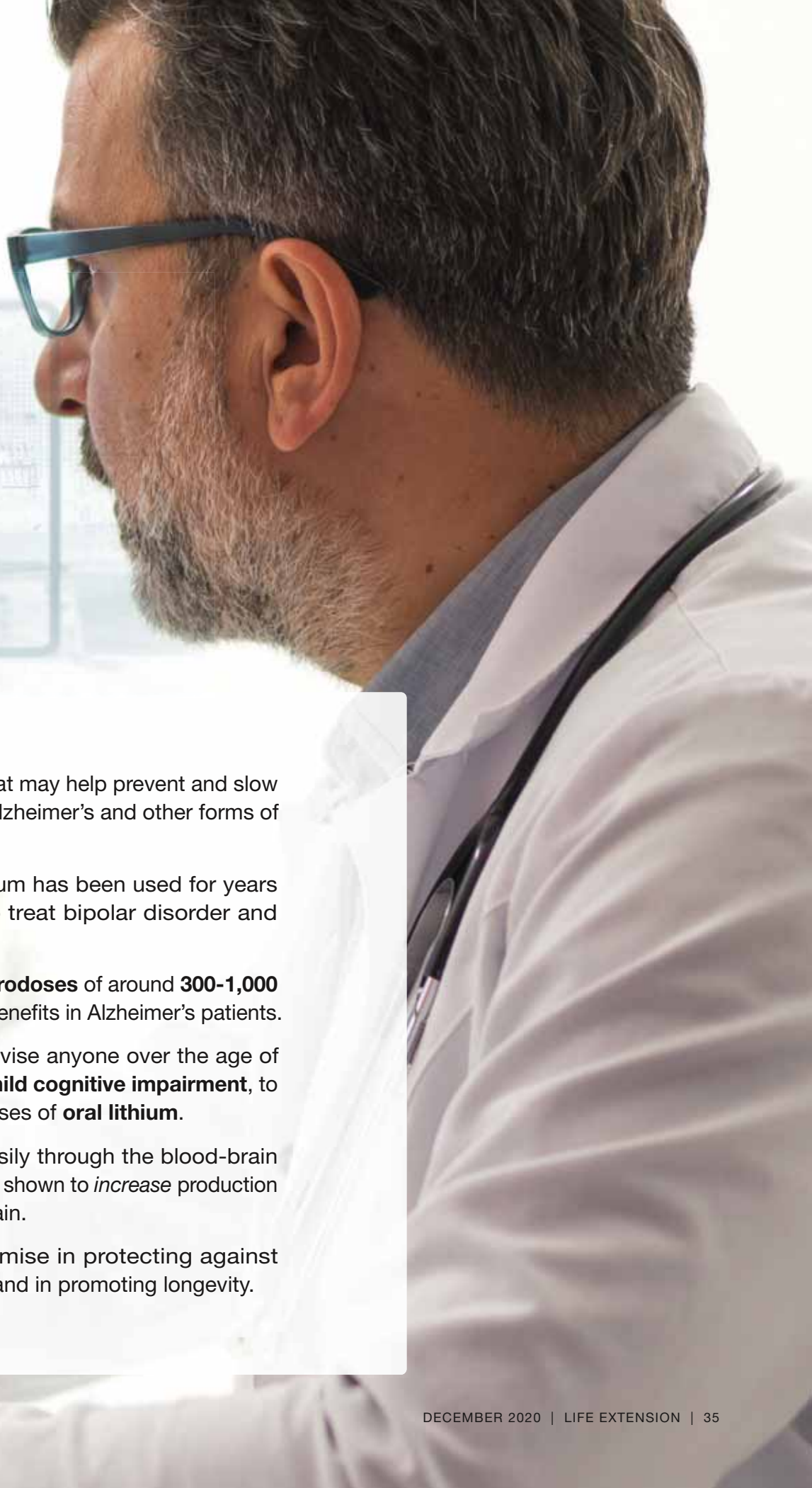
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# LITHIUM, ALZHEIMER'S, and Other Dementias

BY T.R. SHANTHA, MD, PHD, FACA





There is a mineral that may help prevent and slow the progression of Alzheimer's and other forms of dementia: **lithium**.

In large doses, lithium has been used for years as a medication to treat bipolar disorder and depression.

In much smaller **microdoses** of around **300-1,000 mcg**, it has shown benefits in Alzheimer's patients.

As a physician, I advise anyone over the age of 60, or anyone with **mild cognitive impairment**, to start taking microdoses of **oral lithium**.

It's safe, passes easily through the blood-brain barrier, and has been shown to *increase* production of neurons in the brain.

**Lithium** holds promise in protecting against neurodegeneration and in promoting longevity.

## Where Lithium Comes From

**Lithium** is a mineral present in nearly all rocks and natural water sources.

Today, people get small amounts from natural spring water, grains, vegetables, eggs, and milk.

The World Health Organization considers lithium a nutritionally essential trace element, alongside zinc, iodine, and others.

## Lower Rates of Dementia

Doctors have long used **high doses** of lithium to treat **bipolar disorder** and **depression**.

Scientists noticed that bipolar patients receiving lithium had *lower* rates of **cognitive decline** than patients on other medications.<sup>1</sup> That got them interested in whether lithium could be used to treat **neuro-degenerative** disorders.

To test this observation, researchers compared the rates of **Alzheimer's disease** in 66 elderly bipolar patients using **chronic lithium** therapy with 48 similar patients who were *not* prescribed this mineral.

In patients receiving lithium, just **5%** had Alzheimer's, compared with **33%** in the non-lithium group.<sup>2</sup>

Two studies in Denmark confirmed similar results. Investigators surveyed the records of over **21,000**

patients who had received **lithium** treatment and found that it was associated with a reduced rate of Alzheimer's *and* other forms of dementia.<sup>3,4</sup>

And in **2018**, researchers studying lithium levels in different regions of Texas discovered that rates of death from **Alzheimer's** disease were *higher* in areas with *low* levels of lithium in the water.<sup>5</sup>

This finding indicates that high lithium drug doses may not be needed to confer **neuroprotection**.

Based on findings from a **2020** study of Alzheimer's disease in rats, scientists from McGill University have suggested that **microdoses** of **lithium** could slow the progression of Alzheimer's in its initial stages and even *improve* cognition.<sup>6</sup>

## How Lithium Protects the Brain

Experimental and clinical studies offer evidence of the many ways that lithium exerts **neuroprotective** effects.

Microdoses of lithium may help maintain the length of **telomeres**, protective caps on the ends of chromosomes.<sup>7,8</sup> **Telomere length** has been linked to increased longevity and to warding off diseases, including Alzheimer's.







Research shows that lithium promotes the synthesis and release of two vital proteins, **brain-derived neurotrophic factor (BDNF)** and **neurotrophin-3**.<sup>9</sup>

These are both **neurotrophic** factors, which means they stimulate the growth, development, and repair of **brain cells**.<sup>9,10</sup> This may explain why patients on lithium have a significantly higher volume of **gray matter**, the layer of the brain containing nerve cell bodies.<sup>11,12</sup>

One study directly demonstrated that damaged nerve cells exposed to lithium respond with *increases* in the number and length of **dendrites**, the parts of neurons that receive signals from other neurons.<sup>13</sup>

Lithium *reduces* levels of an *enzyme* called **glycogen synthase kinase-3 (GSK-3)**. This enzyme is involved in the production of **neurofibrillary tangles**, which lead to the damaging plaques found in the brains of patients with Alzheimer's.<sup>14-16</sup>

Lithium also reduces oxidative stress and inflammation, providing additional neuroprotection.<sup>1</sup>

### Human Studies

A placebo-controlled trial was conducted on people with a form of **mild cognitive impairment** that made it difficult to learn or recall new information. The study found that low-dose lithium was associated with lower concentrations of abnormal **tau** proteins in cerebrospinal fluid.<sup>17</sup>

Lithium *improved* performance on multiple cognitive scales, suggesting that it may slow the progression of cognitive and functional deficits.<sup>17</sup>

## WHAT YOU NEED TO KNOW

### Lithium Protects the Brain

- **Lithium** is a mineral found in the earth's crust and in many natural bodies of water.
- *Large* doses of lithium have long been used to treat bipolar and other mood disorders.
- Some studies have found that bipolar patients on lithium therapy have *lower* rates of cognitive decline, Alzheimer's disease, and other forms of dementia than those not on lithium.
- Lithium works in a variety of ways to help the brain **produce new neurons** and to prevent the buildup of neurofibrillary tangles and plaques seen in the brains of **Alzheimer's** patients.
- Human studies demonstrate that **microdoses** of lithium improve cognitive performance in patients with mild cognitive impairment, and decrease cognitive decline in patients with Alzheimer's disease.

In another human study, just **300 mcg** of lithium daily **significantly decreased cognitive decline** in Alzheimer's patients compared to a placebo.<sup>18</sup>

In a third study, the cognitive function of patients with **early-stage dementia** who took lithium remained more stable than in those individuals who took a placebo.<sup>19</sup>

I believe that every patient with signs and symptoms of dementia should be on **microdoses** of oral **lithium**. Further experimentation in large-scale clinical trials is still required to assess the true ability of lithium to treat or prevent dementia and cognitive decline.

## Summary

The mineral **lithium** has benefits in the brain.

It has long been used to treat mood disorders, and there is evidence that its neuroprotective properties can help prevent and slow the progression of **Alzheimer's** and other forms of **dementia**.

Studies show that lithium stimulates the growth of neurons, inhibits the development of neurofibrillary tangles seen in the brains of Alzheimer's patients, maintains and increases the length of protective **telomeres**, and much more.

Every person above the age of 60 or 65, or anyone with signs of dementia, could benefit from **microdoses of oral lithium** to promote brain health and protect cognitive function.

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

## References

- Forlenza OV, De-Paula VJR, Diniz BSO. Neuroprotective Effects of Lithium: Implications for the Treatment of Alzheimer's Disease and Related Neurodegenerative Disorders. *ACS Chemical Neuroscience*. 2014;5(6):443-50.
- Nunes PV, Forlenza OV, Gattaz WF. Lithium and risk for Alzheimer's disease in elderly patients with bipolar disorder. *Br J Psychiatry*. 2007 Apr;190:359-60.
- Kessing LV, Forman JL, Andersen PK. Does lithium protect against dementia? *Bipolar Disord*. 2010 Feb;12(1):87-94.
- Kessing LV, Sondergard L, Forman JL, et al. Lithium treatment and risk of dementia. *Arch Gen Psychiatry*. 2008 Nov;65(11):1331-5.
- Fajardo VA, Fajardo VA, LeBlanc PJ, et al. Examining the Relationship between Trace Lithium in Drinking Water and the Rising Rates of Age-Adjusted Alzheimer's Disease Mortality in Texas. *J Alzheimers Dis*. 2018;61(1):425-34.
- Wilson EN, Do Carmo S, Welikovitsh LA, et al. NP03, a Microdose Lithium Formulation, Blunts Early Amyloid Post-Plaque Neuropathology in McGill-R-Thy1-APP Alzheimer-Like Transgenic Rats. *J Alzheimers Dis*. 2020;73(2):723-39.
- Martinsson L, Wei Y, Xu D, et al. Long-term lithium treatment in bipolar disorder is associated with longer leukocyte telomeres. *Transl Psychiatry*. 2013 May 21;3:e261.
- Coutts F, Palmos AB, Duarte RRR, et al. The polygenic nature of telomere length and the anti-ageing properties of lithium. *Neuropsychopharmacology*. 2019 Mar;44(4):757-65.
- Quiroz JA, Machado-Vieira R, Zarate JCA, et al. Novel Insights into Lithium's Mechanism of Action: Neurotrophic and Neuroprotective Effects. *Neuropsychobiology*. 2010;62(1):50-60.
- Leyhe T, Eschweiler GW, Stransky E, et al. Increase of BDNF serum concentration in lithium treated patients with early Alzheimer's disease. *J Alzheimers Dis*. 2009;16(3):649-56.
- Moore GJ, Bebhuk JM, Wilds IB, et al. Lithium-induced increase in human brain grey matter. *The Lancet*. 2000 Oct 7;356(9237):1241-2.
- Chen G, Rajkowska G, Du F, et al. Enhancement of hippocampal neurogenesis by lithium. *J Neurochem*. 2000 Oct;75(4):1729-34.
- Dwivedi T, Zhang H. Lithium-induced neuroprotection is associated with epigenetic modification of specific BDNF gene promoter and altered expression of apoptotic-regulatory proteins. *Front Neurosci*. 2014 2015-January-14;8(457):457.
- Sofola O, Kerr F, Rogers I, et al. Inhibition of GSK-3 ameliorates Abeta pathology in an adult-onset Drosophila model of Alzheimer's disease. *PLoS Genet*. 2010 Sep 2;6(9):e1001087.
- Takashima A. GSK-3 is essential in the pathogenesis of Alzheimer's disease. *J Alzheimers Dis*. 2006;9(3 Suppl):309-17.
- Sofola-Adesakin O, Castillo-Quan JI, Rallis C, et al. Lithium suppresses Abeta pathology by inhibiting translation in an adult Drosophila model of Alzheimer's disease. *Front Aging Neurosci*. 2014;6:190.
- Forlenza OV, Diniz BS, Radanovic M, et al. Disease-modifying properties of long-term lithium treatment for amnesic mild cognitive impairment: randomised controlled trial. *Br J Psychiatry*. 2011 May;198(5):351-6.
- Nunes MA, Viel TA, Buck HS. Microdose lithium treatment stabilized cognitive impairment in patients with Alzheimer's disease. *Curr Alzheimer Res*. 2013 Jan;10(1):104-7.
- Wittenberg SM, Toxopeus KA, Schulte PFJ. [Lithium and its protective effect in Alzheimer's disease]. *Tijdschr Psychiatr*. 2017;59(9):559-63.



## Lithium's Little-Known History

Most people think of **lithium** as a treatment for mental illnesses. But it has a long history as a general health tonic, used to treat ailments as wide-ranging as asthma, gout, and migraines.

**Lithium springs**, where water contains naturally high amounts of the mineral, were popular destinations in the 19<sup>th</sup> and 20<sup>th</sup> centuries, visited by people from near and far, including famous people of the day.

Lithium was also used to fortify foods and beverages. In 1929, a soft drink inventor named Charles Leiper Grigg created a beverage called **Bib-Label Lithiated Lemon-Lime Soda**, now known as **7-Up**. The soda contained lithium until 1950 and was originally marketed for its potential to cure hangovers and lift the mood.

Its modern use in the treatment of mental disorders began in 1948 in Australia. The U.S. Food and Drug Administration first approved its use in 1970.



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Research shows zinc deficiency is common in aging populations—and may contribute to the decline of **immune function**.<sup>1</sup>

Zinc supports and activates:

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- **Thymic** function needed to make immune **T-cells**.

**Life Extension®** combines the superior bioavailability of **zinc monomethionine**<sup>4</sup> with **zinc citrate** to provide 50 mg of these **absorbable** zincs in a single capsule.

For full product description and to order **Zinc Caps**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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

**CAUTION:** Supplemental zinc can inhibit the absorption and availability of copper. If more than **50 mg** of supplemental zinc is to be taken daily for more than four weeks, **2 mg** of supplemental copper should also be taken to reduce the risk of copper deficiency.



**Item #01813 • 90 vegetarian capsules**  
**1 bottle \$6.75**

### References

1. *Immun Ageing*. 2009 Jun 12;6:9.
2. <https://www.sciencedirect.com/science/article/abs/pii/S1756464618303621>.
3. *Am J Clin Nutr*. 2004 Mar;79(3):444-50.
4. *J Trace Elem Med Biol*. 2010 Apr;24(2):89-94.



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(two-month supply)



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# LITHIUM

## The Brain & Body Element

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

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



### LITHIUM

(1,000 mcg of lithium per tiny cap)

Item # 02403 • 100 vegetarian capsules

1 bottle \$12 • 4 bottles \$10.50 each

Each bottle lasts 100 days.

For full product description and to order **Lithium**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

#### References

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



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# Paint Your Heart

A Healthy Picture

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

These pomegranate plant compounds help promote a healthy inflammatory response and combat age-related metabolic changes.



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1 bottle **\$18**  
4 bottles \$15.75 each

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# 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.



Item #02121 • 60 vegetarian capsules

1 bottle **\$19.50**

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Just one daily capsule of **Homocysteine Resist** provides:

5-MTHF (activated folate)	8,500 mcg <sup>o</sup>
Methylcobalamin (activated vitamin B12)	1,000 mcg
Pyridoxal 5'-phosphate (activated vitamin B6)	100 mg
Riboflavin (vitamin B2)	25 mg

<sup>o</sup>DEF (Dietary Folate Equivalents)

**CAUTION:** Do not use this product if treated with methotrexate, fluorouracil, phenytoin, phenobarbital, primidone, or levodopa prior to consultation with your healthcare provider.



For full product description and to order **Homocysteine Resist**, call 1-800-544-4440 or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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# Oral Collagen Improves Skin *and* Joint Health

BY JOHN COOPER

**Collagen** makes up about **one-third** of all protein in the body.<sup>1</sup>

In the **skin** and **joints**, collagen provides structural support, strength and resiliency.

In youth, damaged collagen is continually **repaired** and **replaced**.

But with age, the body's ability to replenish collagen stores declines by about **1.5% each year**.<sup>2</sup>

This loss of collagen is a major contributor to skin aging and loss of joint function.

Whole collagen is a large, complex protein that cannot be easily digested or absorbed into the body.

But scientists have discovered that *partially broken-down* collagen—known as **hydrolyzed collagen**—is highly **absorbable**.

Consumed orally, **hydrolyzed collagen** stimulates the production of new collagen in the skin and joints.<sup>3-5</sup>

## What Is Collagen?

There are **connective tissues** throughout the body, in the skin, bone, cartilage, tendons, ligaments, and more. They give structure, strength, and support to tissues.

All connective tissues have protein fibers within them that influence the mechanics and strength of that tissue. **Collagen** makes up a large proportion of these fibers.

In humans, most of the collagen is present in three forms:<sup>2</sup>

- **Type I collagen** is especially prevalent in the skin, where it makes up over **80%** of all collagen. This collagen is the reinforcement structure of connective tissues. It has great tensile strength, resisting stretching and tearing. It is also prevalent in bone, tendons, and ligaments.
- **Type II collagen** is primarily found in cartilage, the connective tissue that protects the bones at the joints.
- **Type III collagen** is found in skin, cartilage, blood vessels, and throughout many other soft tissues.

Collagen is produced primarily by connective tissue cells called **fibroblasts** and by cartilage cells called **chondrocytes**.

But they produce *less* collagen as we age, gradually declining at a rate of about **1.5%** per year.<sup>2</sup>

In the skin, this loss of collagen has immediate, visible effects. Skin loses elasticity and strength, leading to sagging, fine lines, and wrinkles.<sup>6</sup>

In joints, age-related changes in the collagen structure means articular cartilage no longer functions effectively. This contributes, in part, to the joint stiffness and the movement limitations characteristic of patients with **osteoarthritis**.<sup>8</sup>

## How Oral Collagen Works

Whole collagen is difficult to digest and too large to be absorbed into the body.

But scientists have found that if the collagen is prepared in such a way that it is *already* broken into fragments, as much as **95%** of it can be absorbed and distributed to tissues throughout the body.<sup>2,9</sup>

Collagen formulated in this manner is known as **hydrolyzed collagen**. Once these collagen pieces reach the skin or cartilage, they stimulate repair and rejuvenation of tissues.

Researchers have identified at least two different mechanisms by which this happens:

- Collagen fragments directly activate **fibroblasts** and **chondrocytes**, stimulating them to *increase* their production of collagen and other connective tissue components.<sup>2-5</sup>
- **Immune system** cells recognize the collagen fragments and activate a process that stimulates fibroblasts, further energizing their production of collagen and other connective-tissue proteins.<sup>7</sup>

In **skin**, this improves age-related skin changes, increasing skin hydration and elasticity while reducing fine lines, wrinkles, and dryness.<sup>7</sup>

In **joints**, chondrocytes are stimulated to repair and replace damaged collagen, leading to less pain and greater mobility.<sup>3</sup>

## Healthier, Younger-Looking Skin

Many clinical trials have assessed the ability of **oral collagen** to improve skin health and appearance. In just the last two years, a number of reviews have summarized their findings.<sup>7,10,11</sup>

The vast majority of published studies have found that skin appearance and markers of skin health are improved after oral intake of collagen.<sup>7</sup>

Collectively, these studies show that collagen intake results in:

- Improved skin **hydration**,
- Improved skin **elasticity** (the ability to stretch and bounce back without sagging),
- Improved skin texture and condition, and
- Reduction of lines and wrinkles, including crow's feet.

Oral collagen also benefits the **nails**, improving flexibility and texture.

One joint Korean and Japanese study published in the journal *Nutrients* evaluated the use of **hydrolyzed collagen peptides** (short chains of amino acids that provide the building blocks for collagen) in adult women.<sup>12</sup>

Subjects were randomized to receive either the collagen or a placebo. After six weeks, measurements of **skin hydration** in the **collagen** group were **7.23-fold** greater than the **placebo** group.



By week 12, the visual improvement in **skin wrinkles** was **10.5-fold** greater in the collagen group than in the placebo group. Skin **elasticity** also improved significantly in the collagen group.

Other similar studies have shown comparable findings.<sup>2,7,10</sup>

Several studies have evaluated collagen intake for skin conditions, including dryness, cellulite, and skin ulcers (open sores that don't heal properly).<sup>10</sup>

For all these conditions, oral **hydrolyzed collagen** has a positive impact. It accelerates skin healing, improves skin hydration, reverses signs of skin aging, and reduces cellulite.

## Collagen and Joint Health

**Joints** are structures where two or more bones meet.

**Cartilage** keeps joints like the knee, elbow, fingers, shoulder, and hip working through a full range of motion without pain. This lubricated, rubber-like tissue lines the ends of the bones, cushioning them so that they can glide over each other smoothly without damaging each other.

With wear and tear, **joint cartilage** breaks down. Over time, it becomes thin, rough, and cracked, and can even erode completely, leaving bone on bone.

This condition is referred to as **osteoarthritis**, the most common form of arthritis. It results in inflammation, pain, and significant reduction in the range of motion of joints.

Osteoarthritis is a major source of chronic pain and disability in older adults. Knee osteoarthritis is the most common condition leading to surgical joint replacement.<sup>13</sup>

**Collagen** is vital to the structure and health of **cartilage**, along with other supportive structures around joints, such as ligaments and tendons.

**Hydrolyzed collagen** has been shown to protect cartilage and repair it in an animal model of osteoarthritis, and to improve measures of osteoarthritis severity and quality of life in a clinical trial.<sup>14,15</sup>

In a mouse model of osteoarthritis, hydrolyzed collagen increased total cartilage area, increased the number of chondrocytes producing cartilage, and increased the **extracellular matrix**, which can be thought of as the scaffolding for surrounding tissues.

All of these benefits led to preserved cartilage volume and function.<sup>14</sup> At the same time, it was associated with a reduction in signs of painful **inflammation** in the joint.



## WHAT YOU NEED TO KNOW

### Collagen for Healthy Skin and Strong Joints

- **Collagen** is the most prevalent protein in the body.
- Collagen lends strength and resilience to many tissues, including the **skin** and **joints**.
- With age, collagen production drops. In skin, this contributes to dryness and wrinkles. In joints, this leads to dysfunction and, over time, **osteoarthritis**.
- Oral collagen that has been partially broken down, known as **hydrolyzed collagen**, is easily absorbed into the body and distributed to tissues.
- Human studies have found that hydrolyzed collagen improves markers of skin aging and health, improving **hydration** and **elasticity** while reducing fine lines and wrinkles.
- Collagen has also been found to stimulate **cartilage** repair in joints, improving range of motion and reducing pain.

Collagen has also been tested in **human** subjects.

A randomized, controlled trial evaluated the use of **collagen peptides** in patients suffering from **osteoarthritis**.<sup>15</sup> Subjects receiving placebo had no change in the severity of their symptoms, including pain. But those receiving collagen had significant **reduction in pain**.

Individuals taking collagen also had improvements in other symptoms, like stiffness, physical function, and quality of life.

## Summary

**Collagen** is the most prominent protein in the body. It gives form and strength to various tissues, including the **skin** and **joints**.

Collagen production declines with advancing age. In the skin, that leads to dryness and wrinkles. In joints, it causes a breakdown in cartilage that can result in **arthritis**.



A partially broken-down collagen, known as **hydrolyzed collagen**, is highly absorbable and can reach the skin and joints. There, it stimulates collagen production and improves the overall health and youthfulness of these tissues.

Clinical trials have demonstrated that intake of **hydrolyzed collagen** results in younger-looking skin, improving hydration and reducing wrinkles, while protecting joints and improving their function. •

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

## References

1. Alcock RD, Shaw GC, Burke LM. Bone Broth Unlikely to Provide Reliable Concentrations of Collagen Precursors Compared With Supplemental Sources of Collagen Used in Collagen Research. *Int J Sport Nutr Exerc Metab.* 2019 May 1;29(3):265-72.
2. Sibilla S, Godfrey M, Brewer S, et al. An Overview of the Beneficial Effects of Hydrolysed Collagen as a Nutraceutical on Skin Properties: Scientific Background and Clinical Studies. *The Open Nutraceuticals Journal.* 2015 03/04;8(1):29-42.
3. Oesser S, Seifert J. Stimulation of type II collagen biosynthesis and secretion in bovine chondrocytes cultured with degraded collagen. *Cell Tissue Res.* 2003 Mar;311(3):393-9.
4. Postlethwaite AE, Seyer JM, Kang AH. Chemotactic attraction of human fibroblasts to type I, II, and III collagens and collagen-derived peptides. *Proc Natl Acad Sci U S A.* 1978 Feb;75(2):871-5.
5. Torita A, Miyamoto A, Hasegawa Y. The effects of scallop shell extract on collagen synthesis. *Fisheries Science.* 2007/11/01;73(6):1388-94.
6. Czajka A, Kania EM, Genovese L, et al. Daily oral supplementation with collagen peptides combined with vitamins and other bioactive compounds improves skin elasticity and has a beneficial effect on joint and general wellbeing. *Nutr Res.* 2018 Sep;57:97-108.
7. Barati M, Jabbari M, Navekar R, et al. Collagen supplementation for skin health: A mechanistic systematic review. *J Cosmet Dermatol.* 2020 May 21.
8. Hügle T, Geurts J, Nüesch C, et al. Aging and osteoarthritis: an inevitable encounter? *Journal of aging research.* 2012;2012:950192-.
9. Oesser S, Adam M, Babel W, et al. Oral administration of (14)C labeled gelatin hydrolysate leads to an accumulation of radioactivity in cartilage of mice (C57/BL). *J Nutr.* 1999 Oct;129(10):1891-5.
10. Choi FD, Sung CT, Juhasz ML, et al. Oral Collagen Supplementation: A Systematic Review of Dermatological Applications. *J Drugs Dermatol.* 2019 Jan 1;18(1):9-16.
11. Lupu MA, Gradisteanu Pircalabioru G, Chifiriuc MC, et al. Beneficial effects of food supplements based on hydrolyzed collagen for skin care (Review). *Exp Ther Med.* 2020 Jul;20(1):12-7.
12. Kim DU, Chung HC, Choi J, et al. Oral Intake of Low-Molecular-Weight Collagen Peptide Improves Hydration, Elasticity, and Wrinkling in Human Skin: A Randomized, Double-Blind, Placebo-Controlled Study. *Nutrients.* 2018 Jun 26;10(7).
13. Available at: <https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/knee-replacement-surgery-procedure>. Accessed September 22, 2020.
14. Dar QA, Schott EM, Catheline SE, et al. Daily oral consumption of hydrolyzed type 1 collagen is chondroprotective and anti-inflammatory in murine posttraumatic osteoarthritis. *PLoS One.* 2017;12(4):e0174705.
15. Kumar S, Sugihara F, Suzuki K, et al. A double-blind, placebo-controlled, randomised, clinical study on the effectiveness of collagen peptide on osteoarthritis. *J Sci Food Agric.* 2015 Mar 15;95(4):702-7.



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#### References

1. *Skin Pharmacol Physiol.* 2014;27(3):113-9.
2. *Vet Rec.* 1984 Dec 22-29;114(25-26):642-5.
3. *Nutr Today.* 1993;28(4):13-8.

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# Preserve MUSCLE and Improve Body Composition

BY MICHAEL DOWNEY

Americans are on a constant quest to improve body composition while increasing lean muscle.

It's why we diet, jog, and hit the gym.

Now research has shown that there's a compound that can help.

**Beta-hydroxy-beta-methylbutyrate**, better known as **HMB**, has been shown to improve muscle strength and quality in adults of all ages.<sup>1,2</sup>

It stimulates **protein synthesis** and prevents muscle breakdown.<sup>1</sup>

It even shows benefits in those who are practicing **intermittent fasting** while working out.<sup>3</sup>

HMB may help adults of any age achieve and maintain a **healthier body composition**.

## Fat Vs. Muscle Mass

Having an ideal **body composition** isn't just about looking good.

The ratio of **fat** versus **lean mass** in the body can be an excellent indicator of overall health.<sup>4</sup>

According to the Director of PEAK Health and Wellness at the University of Utah, maintaining a healthy body composition:<sup>4</sup>

- Decreases the risk of cardiovascular disease, diabetes, and osteoporosis,
- Lowers the risk of metabolic syndromes,
- Maintains cognitive function and decreases stress,
- Boosts energy, and
- Enhances the ability to perform daily activities.

Being overweight and even aging itself are associated with a **body composition** of too much stored fat and not enough lean muscle mass.<sup>5</sup>

Body composition is influenced by our genetics, metabolism, or environment.<sup>6</sup>

As a result, researchers have been investigating ways to improve body composition.<sup>6</sup>

## HMB Preserves Muscle

**HMB** (or **beta-hydroxy-beta-methylbutyrate**) is a compound formed naturally when your body breaks down the amino acid **leucine**.<sup>7</sup>

It's been shown to help prevent **sarcopenia**,<sup>8</sup> the age-related loss of muscle mass.

Scientists have demonstrated that HMB works by exerting **pro-anabolic** (muscle-building) and **anti-catabolic** (breakdown-preventing) properties.<sup>9-14</sup>

With age, **HMB** levels *drop*, a decline that correlates with diminished lean muscle mass and strength.<sup>15</sup>

A wealth of evidence has shown that HMB can protect, and even restore, lean muscle mass in older people.<sup>2,14,16-18</sup>

This led scientists to investigate whether **HMB** could protect or restore lean muscle mass in **younger** people—and whether it would work in those who are **overweight** or following muscle-decreasing **fasting** routines.

## HMB in Overweight People

As of 2016, over **650 million** adults worldwide suffered from **obesity**. This amounted to **13%** of the world's adult population at that time.<sup>19</sup>

Scientists designed a clinical trial to investigate the effects of **HMB** on muscle strength in **overweight, sedentary** women, aged **20 to 45**. No exercise training was involved.<sup>1</sup>





The study was the most rigorous type: randomized, placebo-controlled, and double-blind (in which neither the subjects nor the researchers know who's receiving the placebo or treatment).

Thirty-five women completed the study. All had a BMI (body mass index) between 25 and 29.9 kg/m<sup>2</sup>, considered **overweight**.

They were randomly divided into two groups. One was given **2.5 grams** of **HMB** daily in two divided doses, while the other received a **placebo**.<sup>1</sup>

After six weeks, the results showed that taking HMB **increased muscle strength** in these women. Without any resistance training, they were able to lift heavier weights (with both arms *and* legs) than those in the placebo group.<sup>1</sup>

The study also concluded that HMB had a positive impact on various measures of **body composition**, including weight, waist and abdomen circumferences, and skin sagging.<sup>1</sup>

### HMB During Fasting

Another team of scientists investigated how HMB would affect muscle mass in people trying a form of **intermittent fasting** known as **time-restricted feeding**.

So scientists set up a randomized, placebo-controlled, double-blind study to test whether taking **HMB** could prevent this loss in those practicing this form of intermittent fasting.<sup>3</sup>

The research team recruited healthy female volunteers between **18** and **30** years old. All subjects were required to have previously participated in regular resistance training for at least one year.

These **young, active women** were divided into three groups:<sup>3</sup>

- The control group took a placebo and maintained a normal eating schedule.
- A second group took a placebo and followed a time-restricted eating schedule, which permitted eating *only* between noon and 8 p.m.
- A third group took **3 grams** of **HMB** daily and followed the same time-restricted eating schedule as group two.

All groups participated in a resistance training program for three nonconsecutive days each week.



## WHAT YOU NEED TO KNOW

### Improve Body Composition with HMB and Vitamin D

- Maintaining a healthy body composition is vital for overall health.
- **HMB (beta-hydroxy-beta-methylbutyrate)**, a compound formed when the amino acid leucine breaks down, has previously been shown to prevent muscle-wasting in *older* people.
- New studies show that HMB preserves and increases lean muscle mass in adults of *all ages*. It also works in the overweight and in those on intermittent fasting programs.
- **Vitamin D** has also been shown to produce significantly greater muscle strength and performance.
- A *combination* of HMB and vitamin D could be a smart choice for anyone interested in maintaining optimal muscle mass and strength and achieving a healthy body composition.



After **eight weeks**, the researchers found in a subgroup analysis and compared to baseline that:<sup>3</sup>

- The control group had an average **2% increase** in body **fat** mass,
- Group two had an average **4% decrease** in body **fat** mass, and
- Group three, the time-restricted eating group that took **HMB**, had an average **7% decrease in body fat mass**.
- The greatest increases in **fat-free mass** also occurred in the **HMB** participants, who had a shift to a **healthier body composition**.<sup>3</sup>

### Vitamin D Supports Muscle Strength

Like HMB, vitamin D also helps improve **muscle strength and performance**.<sup>20,21</sup>

Scientists conducted a study involving 160 menopausal women, aged 50-65, who all had a history of falling.<sup>22</sup> Falling is associated with inadequate muscle mass, in addition to a lack of coordination and balance.<sup>23</sup>

The women were randomly assigned to receive either a placebo or **1,000 IU of vitamin D** daily.

After nine months, the vitamin D group experienced a **25.3% increase** in leg muscle *strength*.

Other investigators conducted a meta-analysis of 30 randomized, controlled trials, involving more than 5,600 people, to evaluate the effects of vitamin D on muscle performance.<sup>20</sup>

The analysis showed that **vitamin D** had a significant positive effect on overall muscle strength.<sup>20</sup>

Participants who had the *lowest* vitamin D levels at the beginning of the study (below **12 ng/mL**) and those who were relatively *older* saw the greatest benefits from vitamin D supplementation.<sup>20</sup>

### HMB Prevents Muscle-Wasting in Older Adults

Beginning around age 40, we lose an estimated 8% of muscle mass per decade. After age 70, muscle mass decreases by about **15% per decade**.<sup>28</sup>

This drastic decline leaves people weaker and more prone to falls and other injuries.

The medical term for this loss of skeletal muscle mass is **sarcopenia**, and studies show that HMB can help prevent it.

A meta-analysis of seven trials involving a total of 287 older adults found that **HMB** preserved muscle mass in older adults.<sup>17</sup>

One of the studies involved healthy older adults who voluntarily subjected themselves to 10 days of complete **bed rest**,<sup>18</sup> a known cause of sarcopenia.<sup>29,30</sup>

Participants took either a placebo powder or a powder providing **1.5 grams of HMB**, twice daily, starting five days before the bed rest period and continuing until the end of a rehabilitation phase.<sup>18</sup>

At the end of the 10 days, the placebo group had a reduction in total lean body mass of about **4.4 pounds**.

By contrast, those taking HMB lost a total of just **0.37 pounds**, showing a clear benefit in **preserving lean body mass**.



### How Vitamin D Works

There are several ways in which vitamin D can have a beneficial effect on muscle.

Research has shown that **vitamin D**:

- Directly increases the ability of muscle cells to **contract**,<sup>24,25</sup>
- Improves the function and health of the **mitochondria**, the power suppliers in every cell, which increases muscle strength,<sup>26</sup> and
- Reduces chronic **inflammation** that can lead to muscle pain and weakness.<sup>27</sup>

### Summary

Maintaining muscle mass is vital for a healthy body composition.

**HMB** has previously been shown to reduce muscle wasting in *older* adults.

Human studies now confirm that HMB works in adults of **all ages**, promoting muscle growth and function while leading to improvements in strength, lean muscle mass, and body composition.

**Vitamin D** has been shown to boost muscle performance and strength as well.

Vitamin D and HMB can help improve body composition, preserve and increase muscle mass, and promote strength.

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

### References

1. Hashempour A, Hooshmand S, Tabesh MR, et al. Effect of 6-week HMB (beta-hydroxy-beta methylbutyrate) supplementation on muscle strength and body composition in sedentary overweight women. *Obesity Medicine*. 2019 2019/09/01/;15:100115.
2. Stout JR, Smith-Ryan AE, Fukuda DH, et al. Effect of calcium beta-hydroxy-beta-methylbutyrate (CaHMB) with and without resistance training in men and women 65+ yrs: a randomized, double-blind pilot trial. *Exp Gerontol*. 2013 Nov;48(11):1303-10.
3. Tinsley GM, Moore ML, Graybeal AJ, et al. Time-restricted feeding plus resistance training in active females: a randomized trial. *Am J Clin Nutr*. 2019 Sep 1;110(3):628-40.
4. Available at: <https://healthcare.utah.edu/healthfeed/postings/2017/01/body-composition.php>. Accessed September 15, 2020.
5. Available at: <https://www.cdc.gov/obesity/downloads/BMIforpartitions.pdf>. Accessed September 21, 2020.





6. Willoughby D, Hewlings S, Kalman D. Body Composition Changes in Weight Loss: Strategies and Supplementation for Maintaining Lean Body Mass, a Brief Review. *Nutrients*. 2018 Dec 3;10(12).
7. Slater GJ, Jenkins D. Beta-hydroxy-beta-methylbutyrate (HMB) supplementation and the promotion of muscle growth and strength. *Sports Med*. 2000 Aug;30(2):105-16.
8. Argiles JM, Campos N, Lopez-Pedrosa JM, et al. Skeletal Muscle Regulates Metabolism via Interorgan Crosstalk: Roles in Health and Disease. *J Am Med Dir Assoc*. 2016 Sep 1;17(9):789-96.
9. Smith HJ, Wyke SM, Tisdale MJ. Mechanism of the attenuation of proteolysis-inducing factor stimulated protein degradation in muscle by beta-hydroxy-beta-methylbutyrate. *Cancer Res*. 2004 Dec 1;64(23):8731-5.
10. Smith HJ, Mukerji P, Tisdale MJ. Attenuation of proteasome-induced proteolysis in skeletal muscle by {beta}-hydroxy-{beta}-methylbutyrate in cancer-induced muscle loss. *Cancer Res*. 2005 Jan 1;65(1):277-83.
11. Nissen SL, Abumrad NN. Nutritional role of the leucine metabolite beta-hydroxy-beta-methylbutyrate (HMB). *The Journal of Nutritional Biochemistry*. 1997 1997/06/01;8(6):300-11.
12. Nissen S, Sharp RL, Panton L, et al. beta-hydroxy-beta-methylbutyrate (HMB) supplementation in humans is safe and may decrease cardiovascular risk factors. *J Nutr*. 2000 Aug;130(8):1937-45.
13. Feige JN, Lagouge M, Canto C, et al. Specific SIRT1 activation mimics low energy levels and protects against diet-induced metabolic disorders by enhancing fat oxidation. *Cell Metab*. 2008 Nov;8(5):347-58.
14. Wilkinson DJ, Hossain T, Limb MC, et al. Impact of the calcium form of beta-hydroxy-beta-methylbutyrate upon human skeletal muscle protein metabolism. *Clin Nutr*. 2018 Dec;37(6 Pt A):2068-75.
15. Kuriyan R, Lokesh DP, Selvam S, et al. The relationship of endogenous plasma concentrations of beta-Hydroxy beta-Methyl Butyrate (HMB) to age and total appendicular lean mass in humans. *Exp Gerontol*. 2016 Aug;81:13-8.
16. Vukovich MD, Stubbs NB, Bohlken RM. Body composition in 70-year-old adults responds to dietary beta-hydroxy-beta-methylbutyrate similarly to that of young adults. *J Nutr*. 2001 Jul;131(7):2049-52.
17. Wu H, Xia Y, Jiang J, et al. Effect of beta-hydroxy-beta-methylbutyrate supplementation on muscle loss in older adults: a systematic review and meta-analysis. *Arch Gerontol Geriatr*. 2015 Sep-Oct;61(2):168-75.
18. Deutz NE, Pereira SL, Hays NP, et al. Effect of beta-hydroxy-beta-methylbutyrate (HMB) on lean body mass during 10 days of bed rest in older adults. *Clin Nutr*. 2013 Oct;32(5):704-12.
19. Available at: <https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight>. Accessed September 15, 2020.
20. Beaudart C, Buckinx F, Rabenda V, et al. The effects of vitamin D on skeletal muscle strength, muscle mass, and muscle power: a systematic review and meta-analysis of randomized controlled trials. *J Clin Endocrinol Metab*. 2014 Nov;99(11):4336-45.
21. Rejnmark L. Effects of vitamin d on muscle function and performance: a review of evidence from randomized controlled trials. *Ther Adv Chronic Dis*. 2011 Jan;2(1):25-37.
22. Cangussu LM, Nahas-Neto J, Orsatti CL, et al. Effect of vitamin D supplementation alone on muscle function in postmenopausal women: a randomized, double-blind, placebo-controlled clinical trial. *Osteoporos Int*. 2015 Oct;26(10):2413-21.
23. Gama ZA, Gomez-Conesa A. Risk factors for falls in the elderly: systematic review. *Rev Saude Publica*. 2008 Oct;42(5):946-56.
24. Girgis CM, Clifton-Bligh RJ, Hamrick MW, et al. The roles of vitamin D in skeletal muscle: form, function, and metabolism. *Endocr Rev*. 2013 Feb;34(1):33-83.
25. Kinuta K, Tanaka H, Moriwake T, et al. Vitamin D is an important factor in estrogen biosynthesis of both female and male gonads. *Endocrinology*. 2000 Apr;141(4):1317-24.
26. Ryan ZC, Craig TA, Folmes CD, et al. 1alpha,25-Dihydroxyvitamin D3 Regulates Mitochondrial Oxygen Consumption and Dynamics in Human Skeletal Muscle Cells. *J Biol Chem*. 2016 Jan 15;291(3):1514-28.
27. Dalle S, Rossmeislova L, Koppo K. The Role of Inflammation in Age-Related Sarcopenia. *Front Physiol*. 2017;8:1045.
28. Kim TN, Choi KM. Sarcopenia: definition, epidemiology, and pathophysiology. *J Bone Metab*. 2013 May;20(1):1-10.
29. Coker RH, Wolfe RR. Bedrest and sarcopenia. *Curr Opin Clin Nutr Metab Care*. 2012 Jan;15(1):7-11.
30. English KL, Paddon-Jones D. Protecting muscle mass and function in older adults during bed rest. *Curr Opin Clin Nutr Metab Care*. 2010 Jan;13(1):34-9.



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NT2 Collagen <sup>™</sup> standardized cartilage	40 mg
Total Collagen	10 mg
Boron (calcium fructoborate as patented FruiteX-B <sup>®</sup> OsteoBoron <sup>®</sup> )	1.5 mg

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

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**References**

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

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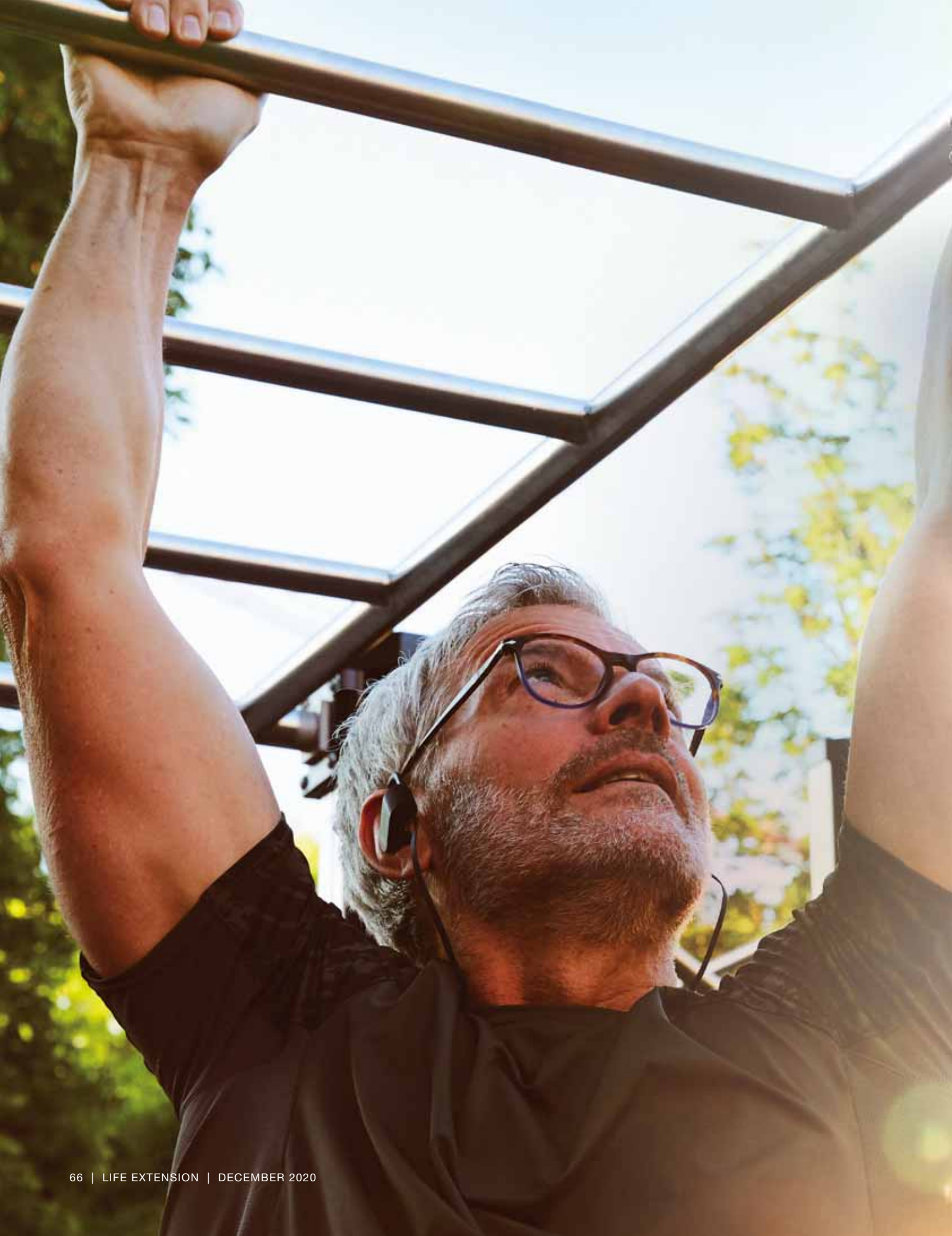
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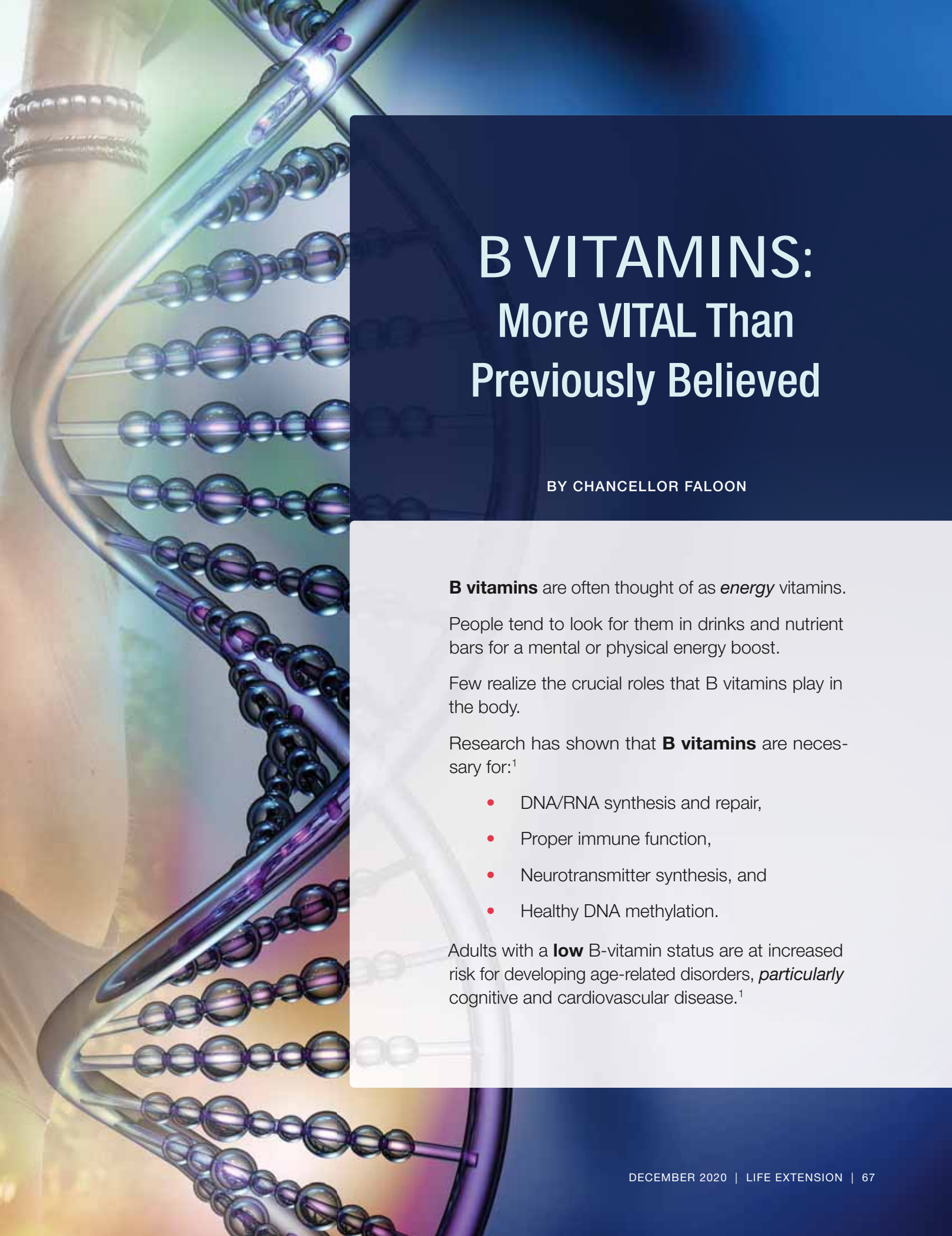


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# B VITAMINS: More VITAL Than Previously Believed

BY CHANCELLOR FALOON

**B vitamins** are often thought of as *energy* vitamins.

People tend to look for them in drinks and nutrient bars for a mental or physical energy boost.

Few realize the crucial roles that B vitamins play in the body.

Research has shown that **B vitamins** are necessary for:<sup>1</sup>

- DNA/RNA synthesis and repair,
- Proper immune function,
- Neurotransmitter synthesis, and
- Healthy DNA methylation.

Adults with a **low** B-vitamin status are at increased risk for developing age-related disorders, *particularly* cognitive and cardiovascular disease.<sup>1</sup>



### Vitamin B1 and the Brain

The first B vitamin identified was **vitamin B1**.<sup>2</sup>

**Thiamine**—another name for vitamin B1—is an important cofactor in the production of energy in the body, making it especially important in the brain.<sup>2</sup>

Research over the past century has shown that vitamin B1 deficiency, known as beriberi, is associated with several neurological problems.<sup>3</sup>

In humans, there are similarities between the memory deficits seen in thiamine deficiency and Alzheimer's disease.<sup>4</sup>

A fat-soluble form of vitamin B1 called **benfotiamine** also shows potential benefits for the brain.<sup>5</sup>

In a 2018 study, researchers tested the impact of **benfotiamine** on a mouse model of **Alzheimer's** disease.<sup>6</sup>

The researchers observed that mice given **benfotiamine** had:<sup>6</sup>

- Decreased numbers of neurofibrillary tangles.
- Significant preservation of motor neurons.
- Less inflammation and mitochondrial dysfunction.
- Significantly increased lifespan and improved behavior.

### Skin Benefits of Boosting NAD<sup>+</sup>

**Vitamin B3** exists in several forms that can convert into **nicotinamide adenine dinucleotide (NAD<sup>+</sup>)** in the body.<sup>7,8</sup>

NAD<sup>+</sup> is a cofactor for life-sustaining reactions in the body, and has garnered a reputation worldwide for its potential longevity benefits.<sup>9</sup>

Studies have also shown that vitamin B3 in the form of **nicotinamide** has the potential to treat a variety of dermatological conditions, including skin cancer.<sup>10,11</sup>

One clinical trial included **386** individuals with a history of at least two non-melanoma skin cancers in the previous five years. They were randomly assigned to receive **500 mg** of **nicotinamide** *twice daily* or a placebo. At 12 months, the rate of non-melanoma skin cancers was reduced by **23%** in those receiving nicotinamide, compared to those who got the placebo.<sup>11</sup>

It has been suggested that nicotinamide's role in skin cancer may be related in part to its ability to promote NAD<sup>+</sup> synthesis, thereby enhancing **DNA repair**. NAD<sup>+</sup> is involved in the synthesis of **ATP**, the cellular energy currency that is much needed during energy-dependent cellular processes, including DNA repair.<sup>10</sup>



## Vitamin B6 and Parkinson's Disease

Parkinson's disease is a disorder characterized by the loss of **dopaminergic neurons** in a part of the brain called the **substantia nigra**, and by the presence of Lewy bodies.<sup>12,13</sup>

Studies have tested the effect of dietary intake of **vitamin B6** in Parkinson's disease. The main reason for this interest is largely the association between Parkinson's and elevated **homocysteine**.<sup>14</sup>

Vitamin B6 is important to properly metabolize homocysteine and prevent its dangerous buildup in the body.<sup>15</sup>

One meta-analysis suggests that *higher* dietary intake of **vitamin B6** may be associated with a **35%** reduced risk of getting Parkinson's disease, compared to those with low intake.<sup>14</sup>

## The B Vitamin that Became a Drug

In a large prospective cohort study, the group with the *highest* levels of **vitamin B6** at the time of kidney cancer diagnosis had a **three-fold** reduction in renal cell carcinoma **mortality** compared to the group with lowest levels.<sup>16</sup>

**Vitamin B6** comes in several forms, including **pyridoxal-5-phosphate** and **pyridoxamine**.

The **FDA** accepted a petition filed by a drug company to remove **pyridoxamine** from the market so

that it could be transformed into a **prescription drug**. This has caused pyridoxamine to be largely unavailable.

Pyridoxamine and pyridoxal-5-phosphate forms of B6 may provide similar benefits, but two clinical trials in the past decade have shown noteworthy results from pyridoxamine.

In a study of schizophrenic patients, high-dose pyridoxamine, as an add-on treatment, resulted in improvements in psychological symptoms.<sup>17</sup>

In a 24-week, double-blind, placebo-controlled trial, pyridoxamine supplementation significantly reduced pain scores and inflammatory markers in osteoarthritis patients.<sup>18</sup>

## WHAT YOU NEED TO KNOW

### B Vitamins Play Crucial Roles in the Body

- **B vitamins** are necessary for DNA repair and synthesis, proper immune function, neurotransmitter synthesis, and healthy DNA methylation.
- Low B-vitamin status *increases* the risk for age-related disorders, particularly cardiovascular and cognitive disease.
- **Vitamin B1** is an important cofactor in the production of energy, making it especially important in the brain.
- **Vitamin B3**, in the form of **nicotinamide**, has the potential to treat a variety of dermatological conditions, including skin cancer.
- **Folate** (5-MTHF) and **vitamins B6** (P5P) and **B12** (methylcobalmin) are important to properly metabolize homocysteine and prevent its dangerous buildup.
- Aging adults can attain these benefits through regular use of a high-quality multivitamin or a comprehensive **B-vitamin** complex.



## Folate Can Reverse Epigenetic Aging

A common gene variant occurs in approximately **40%** of people.

It affects the activity of the *enzyme* needed to convert vitamin B9 (folate) into its active form: **5-methyltetrahydrofolate** (5-MTHF).<sup>21</sup>

One adverse impact of this **methylation deficit** is elevated **homocysteine** blood levels that contribute to **atherosclerosis**.

**Vitamins B6** and **B12** work together with the **5-MTHF** form of folate in the **methylation cycle**.

Sufficient levels of these vitamins support the healthy transfer of **methyl groups** between the molecules, and steps involved in the methylation cycle.

When adequate levels of these vitamins are not present, the methylation cycle is impaired.<sup>19</sup>

Epigenetic clocks allow scientists to accurately predict future healthspan and lifespan.<sup>22,23</sup>

A study published in **2018** tested the effect of **folate** plus **vitamin B12** supplementation in measuring changes in **epigenetic age** in older subjects (65-75). Each subject had different variants of MTHFR genes. Participants supplemented with **400 mcg** of **folic acid** and **500 mcg** of **vitamin B12** daily.<sup>23</sup>

After two years, women with a particular **MTHFR** gene variant showed beneficially reduced **epigenetic age**.

Those with deleterious MTHFR variants should supplement with higher dosages of the **5-MHTF** form of folate, which is more effective than folic acid. They should also consider using the methylated form of vitamin B12, called **methylcobalamin**.

## Decreasing Macular Degeneration Risk

A study was done to evaluate the impact of B vitamins on age-related **macular degeneration**. A combination of **folic acid** and **vitamins B6** and **B12** was used in a randomized, placebo-controlled trial in women over age 40 who were at high risk for cardiovascular disease. The study period lasted an average of **7.3** years.<sup>24</sup>

Compared to the placebo group, the **B-vitamin** combination decreased the risk of **macular degeneration** by **34%** and decreased the risk of severe macular degeneration by **41%**.<sup>24</sup>

## B Complex Fights Insomnia

B vitamins are thought to have anti-depressant effects and play a range of biochemical roles that may help reduce psychological distress.

Although B vitamins are commonly added to caffeine supplements or drinks for a physical energy boost, they do not interfere with sleep. In fact, research suggests they may even help support healthy sleep.

In a recently published clinical trial, **60** people with diagnosed insomnia filled out a questionnaire which quantified the degree of insomnia they had. They were separated into two groups to receive either a placebo or a supplement containing melatonin, vitamins B6, B12, folate, and a form of magnesium. Both groups took their pills one hour before going to bed, for three months.<sup>27</sup>

When the participants took the questionnaire again at the end of the study, the placebo group had a slight increase in the degree of insomnia, while those who received the combination supplement reported a nearly **30%** decrease in their insomnia scores.







The authors of the study suggest that their results support the hypothesis that elevated **homocysteine** levels may be causally related to age-related macular degeneration.

### Protection Against Surgery-Induced Delirium

New evidence is showing that B vitamins may diminish a serious side effect of major surgery.<sup>25</sup>

In a recent clinical trial, **138 patients** with vitamin B12 deficiency undergoing coronary artery **bypass surgery** were assigned into a control or an experimental group to receive a **B-complex solution** as part of the surgical procedure.<sup>25</sup>

The researchers wanted to see if the B complex could reduce the incidence of **postoperative delirium** compared to controls.

Although open heart surgery is a lifesaving procedure, it also commonly causes serious side effects. One of the most frightening potential problems after such major surgeries is postoperative delirium, which is a state characterized by altered consciousness and orientation, and diminished memory, perception, and behavior.<sup>26</sup>

Following surgery, **42%** of the patients in the control group experienced postoperative delirium, but only **26%** of those in the **B-complex** group did.<sup>25</sup>

### Enhance Healthy DNA Methylation

**DNA methylation** controls the activation of our genes.

Without proper **DNA methylation**, beneficial **genes** are deactivated while harmful genes can be over-expressed.

Healthy methylation allows **gene expression** to support youthful cellular functions. **DNA methylation** influences how your genes are expressed.<sup>19</sup>

Accurate estimates of **biological age** can be assessed through measurements of **DNA methylation** patterns in the blood.<sup>20</sup>

This can be done using **epigenetic clocks**, a technology developed by **UCLA** researchers to measure **DNA methylation** patterns that provides an epigenetic or biological age estimate.

“**Epigenetics**” refers to external modifications that occur in **gene expression** as result of what we do to our bodies, as opposed to the genetic code we are born with.

Ingesting overcooked food or inhaling cigarette **smoke** causes deleterious **epigenetic** changes to **DNA**. Healthy lifestyles enable beneficial gene expression changes.

Deficits in certain **B vitamins** can also adversely impact healthy **DNA methylation**.

## Summary

**B vitamins** are essential for multiple cellular functions, including facilitating vital **DNA repair**.

These benefits can be attained through regular use of a high-quality multivitamin, or taking a comprehensive B-complex supplement, preferably one that uses *activated* forms like **5-MTHF (folate)**, **methylcobalamin (B12)**, and **pyridoxal-5-phosphate (B6)**.

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

- Mikkelsen K, Apostolopoulos V. B Vitamins and Ageing. *Subcell Biochem.* 2018;90:451-70.
- Fattal-Valevski A. thiamine (vitamin B1).
- Gibson GE, Hirsch JA, Fonzeetti P, et al. Vitamin B1 (thiamine) and dementia. *Ann N Y Acad Sci.* 2016 Mar;1367(1):21-30.
- KOPELMAN MD. Frontal Dysfunction and Memory Deficits in the Alcoholic Korsakoff Syndrome and Alzheimer-Type Dementia. *Brain.* 1991;114A(1):117-37.
- Yadav UCS, Kalariya NM, Srivastava SK, et al. Protective role of benfotiamine, a fat-soluble vitamin B1 analogue, in lipopolysaccharide-induced cytotoxic signals in murine macrophages. *Free Radical Biology and Medicine.* 2010;48(10):1423-34.
- Tapias V, Jainuddin S, Ahuja M, et al. Benfotiamine treatment activates the Nrf2/ARE pathway and is neuroprotective in a transgenic mouse model of tauopathy. *Hum Mol Genet.* 2018 Aug 15;27(16):2874-92.
- Yang Y, Sauve AA. NAD + metabolism: Bioenergetics, signaling and manipulation for therapy. *Biochimica et Biophysica Acta (BBA) - Proteins and Proteomics.* 2016 Dec;1864(12):1787-800.
- Denu JM. Vitamins and Aging: Pathways to NAD+ Synthesis. *Cell.* 2007 2007/05/04;129(3):453-4.
- Yaku K, Okabe K, Nakagawa T. NAD metabolism: Implications in aging and longevity. *Ageing Research Reviews.* 2018 Nov;47:1-17.
- Nazarali S, Kuzel P. Vitamin B Derivative (Nicotinamide) Appears to Reduce Skin Cancer Risk. *Skin Therapy Lett.* 2017 Sep;22(5):1-4.
- Chen AC, Martin AJ, Choy B, et al. A Phase 3 Randomized Trial of Nicotinamide for Skin-Cancer Chemoprevention. *N Engl J Med.* 2015 Oct 22;373(17):1618-26.
- Kalia LV, Lang AE. Parkinson's disease. *The Lancet.* 2015 Aug 29;386(9996):896-912.
- Available at: <https://www.ncbi.nlm.nih.gov/books/NBK470193/>. Accessed September 10, 2020.
- Shen L. Associations between B Vitamins and Parkinson's Disease. *Nutrients.* 2015 Aug 27;7(9):7197-208.
- Selhub J. Homocysteine metabolism. *Annu Rev Nutr.* 1999; 19:217-46.
- Muller DC, Johansson M, Zaridze D, et al. Circulating Concentrations of Vitamin B6 and Kidney Cancer Prognosis: A Prospective Case-Cohort Study. *PLoS One.* 2015;10(10):e0140677.
- Itokawa M, Miyashita M, Arai M, et al. Pyridoxamine: A novel treatment for schizophrenia with enhanced carbonyl stress. *Psychiatry and Clinical Neurosciences.* 2018 Jan;72(1):35-44.
- Garg S, Syngle A, Vohra K. Efficacy and tolerability of advanced glycation end-products inhibitor in osteoarthritis: a randomized, double-blind, placebo-controlled study. *Clin J Pain.* 2013 Aug;29(8):717-24.
- Kok DEG, Dhonukshe-Rutten RAM, Lute C, et al. The effects of long-term daily folic acid and vitamin B12 supplementation on genome-wide DNA methylation in elderly subjects. *Clinical Epigenetics.* 2015 2015/11/14;7(1):121.
- Jylhävä J, Pedersen NL, Hägg S. Biological Age Predictors. *EBio-Medicine.* 2017 Jul;21:29-36.
- Moll S, Varga EA. Homocysteine and MTHFR Mutations. *Circulation.* 2015 Jul 7;132(1):e6-9.
- Lu AT, Quach A, Wilson JG, et al. DNA methylation GrimAge strongly predicts lifespan and healthspan. *Ageing.* 2019;11(2):303-27.
- Sae-Lee C, Corsi S, Barrow TM, et al. Dietary Intervention Modifies DNA Methylation Age Assessed by the Epigenetic Clock. *Mol Nutr Food Res.* 2018 Dec;62(23):e1800092.
- Christen WG, Glynn RJ, Chew EY, et al. Folic Acid, Pyridoxine, and Cyanocobalamin Combination Treatment and Age-Related Macular Degeneration in Women. *Archives of Internal Medicine.* 2009 Feb 23;169(4):335-41.
- Demirdas E, Atilgan K. Addition of Vitamin B Complex to Prime Solution in Cobalamin-Deficient Patients to Prevent Postoperative Delirium. *Heart Surg Forum.* 2019 Feb 25;22(2):E082-E7.
- Levin P. Postoperative Delirium. In: Atlee JL, ed. *Complications in Anesthesia.* Philadelphia: W.B. Saunders; 2007:888-9.
- Djokic G, Vojvodic P, Korcok D, et al. The Effects of Magnesium – Melatonin – Vit B Complex Supplementation in Treatment of Insomnia. *Open Access Macedonian Journal of Medical Sciences.* 2019 Sep 30;7(18):3101-5.





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\* Aging Cell. 2015 Aug;14(4):644-58.



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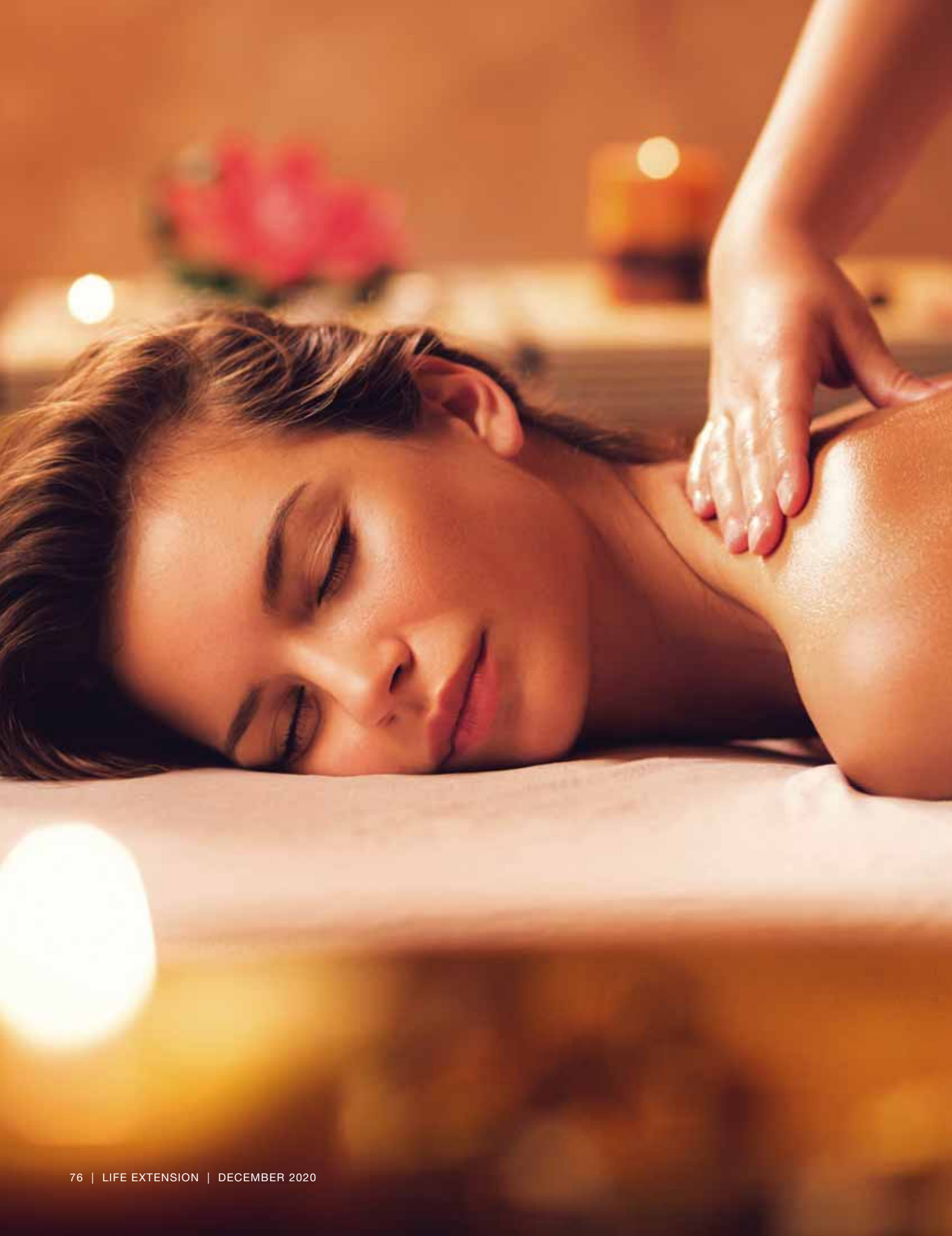
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# Recent MASSAGE THERAPY Conferences

BY BEN BEST

Massage therapy can be of benefit for pain, fatigue, anxiety, stiffness, and many other ailments in addition to being relaxing and feeling good.

The **opioid crisis** (skyrocketing use of legal and illegal opioid drugs), in combination with increasing complaints of chronic pain, has caused many people to give more attention to non-drug therapies.

The preference for drug treatments over other therapies by medical professionals has been a consequence of FDA drug-centered medicine.

Only large drug companies can afford the large, clinical trials that the FDA requires to approve a drug therapy. No one is going to spend hundreds of millions of dollars on clinical trials for unpatentable therapies like massage, yoga, or acupuncture.

Reviews of massage clinical trials often conclude that the evidence is weaker than for drug-based clinical trials because large, well-funded trials have not been conducted for massage.



Massage therapy clinical trials face another disadvantage because the quality of massage treatment is not uniform. Massage therapists have different strengths, skills, and techniques. And there are different types of massage. Swedish (relaxation, stroking) massage can be better therapy for anxiety, deep tissue (more pressure) massage can be better therapy for pain or fatigue, and Thai (stretching) massage can be better therapy for stiffness.

Use of opioid drugs for pain has become such a prominent social issue that the problem created by FDA drug-centered medicine can no longer be ignored. Nor can drug companies facing ever-expanding lawsuits ignore the problem.

This article covers presentations on the scientific value of therapeutic massage given at recent massage conferences.

### Opioid Crisis

Robert Kerns, PhD, (Professor of Psychiatry, Neurology and Psychology, Yale University, New Haven, Connecticut) believes that the opioid crisis could have been prevented if massage, exercise, yoga, progressive relaxation, and other forms of non-drug therapy were used for treatment of pain.<sup>1</sup> Use of the prescription opioid drug oxycodone for cancer-related pain increased **four-fold** between 1997 and 2002. Illicit drug abuse of prescription opioid drugs now exceeds that of the illegal drugs heroin or cocaine.<sup>2</sup>



Robert Kerns, PhD

Opioid drugs can be beneficial for acute (short term) pain relief but have not proven beneficial for chronic (long term, over six months) pain. Common side effects of opioids include constipation, nausea, and excessive sleepiness.<sup>3</sup> Long-term use of opioid drugs also produces tolerance (the patient requires an increase in the amounts of opioids necessary to relieve pain).<sup>4</sup>

Massage can be of benefit for pain, without side effects.<sup>5</sup> Massage is particularly beneficial for cancer pain.<sup>6</sup>

### Pain in Fascia

Helene Langevin, MD (Director, National Center for Complementary and Integrative Health, Bethesda, Maryland) has studied the cause and treatment of inflamed **fascia** (connective tissue surrounding organs) in chronic-pain conditions. Fascia can be infiltrated with nerves that contribute to the sensation of pain. She has shown an accumulation of additional connective tissue in areas of the back where patients experience lower-back pain.<sup>7</sup> Dr. Langevin has shown that stretching of connective tissue in the back, which could be done with massage or yoga, may reduce the inflammation and/or fibrosis seen in lower-back-pain subjects.<sup>8</sup>



Helene Langevin, MD

Dr. Langevin believes a similar kind of inflammation is seen in repetitive-strain injury, as in lower back pain.<sup>9</sup> Massage therapy can reduce inflammation and neural fibrosis due to repetitive-strain injury.<sup>10</sup> Similarly, a combination of massage and trigger-point therapy



has been shown to be an effective treatment for carpal tunnel syndrome (a repetitive-strain injury of the wrist).<sup>11</sup> Persons suffering from repetitive-strain injury generally seek help after developing symptoms, but massage therapy to the affected tissues may **prevent** repetitive-strain injury before it happens.<sup>12</sup>

### Massage for Breast Cancer Survivors

Jeanne Massingill, LMT (Owner, The Oaks Medical Massage Therapy Clinic, Rocky River, Ohio) has used massage therapy to treat breast cancer survivors.



Jeanne Massingill, LMT

Massage has been shown to relieve pain, anxiety, and improve the overall well-being of women whose breast has been removed due to cancer.<sup>13</sup>

Tendons join muscle to bone, ligaments join bone to bone, but fascia is a thin sheet of connective tissue that surrounds and encases every muscle, nerve, bone, blood vessel and organ in the body, securing and linking them.<sup>14</sup> Manual therapy can reduce fascial tightness and improve blood circulation.<sup>15</sup> Stiffness of fascia has been associated with cancer growth.<sup>16</sup>

Up to **60%** of breast cancer surgery survivors experience chronic pain.<sup>17</sup> **Myofascial massage** is a massage technique that applies pressure and stretching to fascia. Massingill conducted a clinical trial of myofascial massage on patients complaining of chronic pain following breast cancer surgery. Compared to Swedish massage or light touch, patients receiving myofascial massage had less pain, better mobility, and improved general health.<sup>18</sup>

### Cervicogenic Headache

Til Luchau (Lead Instructor and Director of Advanced Trainings, Lafayette, Colorado) is concerned with treatment for cervicogenic headaches. A **cervicogenic**



Til Luchau

**headache** is a headache resulting from neck pain. An estimated **15%-20%** of headaches are cervicogenic.<sup>19</sup> Women have cervicogenic headaches more frequently than men.<sup>20</sup> Massage therapy combined with neck exercises can relieve cervicogenic headache.<sup>21</sup> Benefit has also been reported for

manual therapy on trigger points of the muscle running from the back of the skull to the center of the chest (the sternocleidomastoid muscle).<sup>22</sup>

### Low Back Pain

Kathryn Stewart, BS, LMT (Professor, Family and Community Medicine, University of Kentucky College of Medicine, Lexington, Kentucky) is interested in treatment for lower back pain.



Kathryn Stewart, BS, LMT

Lower back pain is a very common cause of disabilities, which is more frequently seen in persons of lower socioeconomic status.<sup>23</sup>

Stewart is an advocate of evaluating massage therapy for lower back pain by having patients directly seek care from community massage therapists.<sup>24</sup> In one study involving 10 massage sessions, almost half of the patients showed reduced pain after 12 weeks, and **40%** continued to show relief at 24 weeks.<sup>25</sup>

### Fibromyalgia

Julie Goodwin, LMT (Instructor, Massage Therapy Program, Pima Community College, Tucson, Arizona) specializes in massage therapy for patients with fibromyalgia. **Fibromyalgia** is characterized by widespread



Julie Goodwin, LMT

pain, which can lead to sleep difficulties and general fatigue. There is a wide range of prevalence estimates, some as high as **12%**, in which females are about three times more likely to have the condition than males.<sup>26</sup> Systematic reviews of a variety of massage techniques show treatment of over five weeks to reduce pain, anxiety, and depression.<sup>27</sup> All massage techniques improved health-related quality of life.<sup>28</sup>



## Massage for Athletes

Lee Stang, LMT (Owner, Bridges To Health Therapeutic Massage Center, Hendersonville, North Carolina) gives massage therapy to athletes. Massage has been shown to improve blood vessel function after exercise-induced muscle injury.<sup>29</sup> Triathlon athletes who received massage therapy after completion of a competition reported better recovery from pain and fatigue.<sup>30</sup> Massage has been used to relieve travel fatigue in athletes who have spent many hours confined to airplane seats across many time zones.<sup>31</sup>



Lee Stang, LMT

In a well-controlled experiment, muscle samples were taken from both legs of healthy young males who had received massage on only one randomly selected leg after exercise. The massaged leg showed reduced inflammation and increased formation of energy-producing mitochondria cellular components, compared to the unmassaged leg.<sup>32</sup>

## Manual Lymphatic Drainage

Judy Stahl, MA (Founder, Prescott Center for Massage Therapy, Prescott, Arizona) has expertise in the type of massage known as **manual lymphatic drainage (MLD)**. Lymph is a watery fluid containing waste products that flows from body tissues to lymph nodes, and then to the heart, independent of the blood circulatory system. Lymph is weakly propelled by muscle contraction, so it moves much more slowly than blood. Lymph nodes break down debris in the lymph before the lymph is returned to the circulatory system (returned to the heart).<sup>33</sup>



Judy Stahl, MA

The brain has an independent lymphatic system known as the **glymphatic system**. The glymphatic system is most active during sleep, which is part of the reason why sleep deprivation reduces mental function.<sup>34</sup>

MLD massage is used to compensate for insufficient fluid flow in the lymphatic system. Orthopedic (bone or muscle) injuries often result in impaired lymph flow, which can be improved by MLD.<sup>35</sup> Application of MLD prior to surgery for varicose veins can improve the outcome.<sup>36</sup> **Cellulite** has also been shown to be reduced by MLD.<sup>37</sup>

Breast cancer surgery often removes lymph nodes and damages the lymphatic system. Up to **49%** of women whose breast has been removed experience lymphatic swelling.<sup>38</sup> MLD has been shown to reduce lymphatic swelling following breast cancer treatment.<sup>39</sup>

## Massage for Anxiety

Mark Hyman Rapaport, MD (Chairman, Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, Georgia) is interested in the effectiveness of Swedish massage therapy to reduce anxiety or fatigue. Studies by earlier researchers have shown that massage can reduce anxiety.<sup>40</sup> A study of patients randomized to receive or not receive massage after cardiovascular surgery showed reduced pain, anxiety, and tension in the massaged patients.<sup>41</sup>



Mark Hyman Rapaport, MD

Dr. Rapaport has shown that six weeks of Swedish massage can significantly reduce fatigue in cancer treatment survivors when compared to light touch.<sup>42</sup> Measuring blood and saliva samples of persons who had received either 45 minutes of light touch or Swedish massage twice weekly for five weeks, Dr. Rapaport found an increase in the social-binding hormone oxytocin, and a decrease in the stress hormone cortisol.<sup>43</sup>

Generalized anxiety disorder is a condition characterized by uncontrollably excessive worry. Dr. Rapaport conducted a clinical trial in which general-anxiety-disorder patients were randomly assigned to receive either Swedish massage or light touch twice weekly for six weeks. Compared to light touch, the patients receiving Swedish massage showed a significant reduction in worry beginning at the end of the third week, based on questionnaires they completed.<sup>44</sup>

## Concluding Remarks

Massage is not simply a self-indulgence, but it can be a valuable therapy for many conditions. Although studies proving the benefits of massage are often small, in size and funding, side effects are rare. Physicians should be encouraged to try massage therapy before trying drugs.

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

- Qaseem A, Wilt TJ, McLean RM, et al. Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. *Ann Intern Med*. 2017 Apr 4;166(7):514-30.
- Van Zee A. The promotion and marketing of oxycontin: commercial triumph, public health tragedy. *Am J Public Health*. 2009 Feb;99(2):221-7.
- Manchikanti L, Vallejo R, Manchikanti KN, et al. Effectiveness of long-term opioid therapy for chronic non-cancer pain. *Pain Physician*. 2011 Mar-Apr;14(2):E133-56.
- Available at: <https://www.uspharmacist.com/article/acute-pain-management-in-patients-with-opioid-tolerance>. Accessed September 23, 2020.
- Nahin RL, Boineau R, Khalsa PS, et al. Evidence-Based Evaluation of Complementary Health Approaches for Pain Management in the United States. *Mayo Clin Proc*. 2016 Sep;91(9):1292-306.
- Lee SH, Kim JY, Yeo S, et al. Meta-Analysis of Massage Therapy on Cancer Pain. *Integr Cancer Ther*. 2015 Jul;14(4):297-304.
- Langevin HM, Stevens-Tuttle D, Fox JR, et al. Ultrasound evidence of altered lumbar connective tissue structure in human subjects with chronic low back pain. *BMC Musculoskelet Disord*. 2009 Dec 3;10:151.
- Corey SM, Vizzard MA, Bouffard NA, et al. Stretching of the back improves gait, mechanical sensitivity and connective tissue inflammation in a rodent model. *PLoS One*. 2012;7(1):e29831.
- Barbe MF, Barr AE, Gorzelany I, et al. Chronic repetitive reaching and grasping results in decreased motor performance and widespread tissue responses in a rat model of MSD. *J Orthop Res*. 2003 Jan;21(1):167-76.
- Bove GM, Delany SP, Hobson L, et al. Manual therapy prevents onset of nociceptor activity, sensorimotor dysfunction, and neural fibrosis induced by a volitional repetitive task. *Pain*. 2019 Mar;160(3):632-44.
- Elliott R, Burkett B. Massage therapy as an effective treatment for carpal tunnel syndrome. *J Bodyw Mov Ther*. 2013 Jul;17(3):332-8.
- Bove GM, Harris MY, Zhao H, et al. Manual therapy as an effective treatment for fibrosis in a rat model of upper extremity overuse injury. *J Neurol Sci*. 2016 Feb 15;361:168-80.
- Drackley NL, Degnim AC, Jakub JW, et al. Effect of massage therapy for postsurgical mastectomy recipients. *Clin J Oncol Nurs*. 2012 Apr;16(2):121-4.
- Available at: <https://www.hopkinsmedicine.org/health/wellness-and-prevention/muscle-pain-it-may-actually-be-your-fascia>. Accessed September 28, 2020.
- Findley T, Chaudhry H, Stecco A, et al. Fascia research--a narrative review. *J Bodyw Mov Ther*. 2012 Jan;16(1):67-75.
- Langevin HM, Keely P, Mao J, et al. Connecting (T)issues: How Research in Fascia Biology Can Impact Integrative Oncology. *Cancer Res*. 2016 Nov 1;76(21):6159-62.
- Wang L, Guyatt GH, Kennedy SA, et al. Predictors of persistent pain after breast cancer surgery: a systematic review and meta-analysis of observational studies. *CMAJ*. 2016 Oct 4;188(14):E352-E61.
- Massingill J, Jorgensen C, Dolata J, et al. Myofascial Massage for Chronic Pain and Decreased Upper Extremity Mobility After Breast Cancer Surgery. *Int J Ther Massage Bodywork*. 2018 Aug;11(3):4-9.
- Page P. Cervicogenic headaches: an evidence-led approach to clinical management. *Int J Sports Phys Ther*. 2011 Sep;6(3):254-66.
- Chaibi A, Russell MB. Manual therapies for cervicogenic headache: a systematic review. *J Headache Pain*. 2012 Jul;13(5):351-9.
- Youssef EF, Shanb AS. Mobilization versus massage therapy in the treatment of cervicogenic headache: a clinical study. *J Back Musculoskelet Rehabil*. 2013;26(1):17-24.
- Bodes-Pardo G, Pecos-Martin D, Gallego-Izquierdo T, et al. Manual treatment for cervicogenic headache and active trigger point in the sternocleidomastoid muscle: a pilot randomized clinical trial. *J Manipulative Physiol Ther*. 2013 Sep;36(7):403-11.
- Shmigel A, Foley R, Ibrahim H. Epidemiology of Chronic Low Back Pain in US Adults: Data From the 2009-2010 National Health and Nutrition Examination Survey. *Arthritis Care Res (Hoboken)*. 2016 Nov;68(11):1688-94.
- Munk N, Stewart K, Love MM, et al. The Intersection of Massage Practice and Research: Community Massage Therapists as Research Personnel on an NIH-funded Effectiveness Study. *Int J Ther Massage Bodywork*. 2014 Jun;7(2):10-9.
- Elder WG, Munk N, Love MM, et al. Real-World Massage Therapy Produces Meaningful Effectiveness Signal for Primary Care Patients with Chronic Low Back Pain: Results of a Repeated Measures Cohort Study. *Pain Med*. 2017 Jul 1;18(7):1394-405.
- Arnold LM, Bennett RM, Crofford LJ, et al. AAPT Diagnostic Criteria for Fibromyalgia. *J Pain*. 2019 Jun;20(6):611-28.
- Li YH, Wang FY, Feng CQ, et al. Massage therapy for fibromyalgia: a systematic review and meta-analysis of randomized controlled trials. *PLoS One*. 2014;9(2):e89304.
- Yuan SL, Matsutani LA, Marques AP. Effectiveness of different styles of massage therapy in fibromyalgia: a systematic review and meta-analysis. *Man Ther*. 2015 Apr;20(2):257-64.
- Franklin NC, Ali MM, Robinson AT, et al. Massage therapy restores peripheral vascular function after exertion. *Arch Phys Med Rehabil*. 2014 Jun;95(6):1127-34.
- Nunes GS, Bender PU, de Menezes FS, et al. Massage therapy decreases pain and perceived fatigue after long-distance Ironman triathlon: a randomised trial. *J Physiother*. 2016 Apr;62(2):83-7.
- Calleja-Gonzalez J, Mielgo-Ayuso J, Sampaio J, et al. Brief ideas about evidence-based recovery in team sports. *J Exerc Rehabil*. 2018 Aug;14(4):545-50.
- Crane JD, Ogborn DI, Cupido C, et al. Massage therapy attenuates inflammatory signaling after exercise-induced muscle damage. *Sci Transl Med*. 2012 Feb 1;4(119):119ra13.
- Available at: <https://www.ncbi.nlm.nih.gov/books/NBK513247/>. Accessed September 23, 2020.
- Xie L, Kang H, Xu Q, et al. Sleep drives metabolite clearance from the adult brain. *Science*. 2013 Oct 18;342(6156):373-7.
- Majewski-Schrage T, Snyder K. The Effectiveness of Manual Lymphatic Drainage in Patients With Orthopedic Injuries. *J Sport Rehabil*. 2016 Feb;25(1):91-7.
- Molski P, Kruczynski J, Molski A, et al. Manual lymphatic drainage improves the quality of life in patients with chronic venous disease: a randomized controlled trial. *Arch Med Sci*. 2013 Jun 20;9(3):452-8.
- Bayrakci Tunay V, Akbayrak T, Bakar Y, et al. Effects of mechanical massage, manual lymphatic drainage and connective tissue manipulation techniques on fat mass in women with cellulite. *J Eur Acad Dermatol Venerol*. 2010 Feb;24(2):138-42.
- Warren AG, Brorson H, Borud LJ, et al. Lymphedema: a comprehensive review. *Ann Plast Surg*. 2007 Oct;59(4):464-72.
- Ezzo J, Manheimer E, McNeely ML, et al. Manual lymphatic drainage for lymphedema following breast cancer treatment. *Cochrane Database Syst Rev*. 2015 May 21(5):CD003475.
- Moyer CA, Rounds J, Hannum JW. A meta-analysis of massage therapy research. *Psychol Bull*. 2004 Jan;130(1):3-18.
- Cutshall SM, Wentworth LJ, Engen D, et al. Effect of massage therapy on pain, anxiety, and tension in cardiac surgical patients: a pilot study. *Complement Ther Clin Pract*. 2010 May;16(2):92-5.
- Kinkead B, Schettler PJ, Larson ER, et al. Massage therapy decreases cancer-related fatigue: Results from a randomized early phase trial. *Cancer*. 2018 Feb 1;124(3):546-54.
- Rapaport MH, Schettler P, Bresee C. A preliminary study of the effects of repeated massage on hypothalamic-pituitary-adrenal and immune function in healthy individuals: a study of mechanisms of action and dosage. *J Altern Complement Med*. 2012 Aug;18(8):789-97.
- Rapaport MH, Schettler P, Larson ER, et al. Acute Swedish Massage Monotherapy Successfully Remediate Symptoms of Generalized Anxiety Disorder: A Proof-of-Concept, Randomized Controlled Study. *J Clin Psychiatry*. 2016 Jul;77(7):e883-91.

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## References

1. Available at: <http://lpi.oregonstate.edu/mic/vitamins/thiamin>. Accessed January 4, 2018.
2. *Neurosci Bull.* 2016;32(6):591-6.



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Roasted cauliflower might be tasty—but Braised Cauliflower with Garlic, Ginger, and Soy sounds much better.

If you only have a few ingredients on hand, *The Side Dish Bible* provides dozens of simple, tried-and-true recipes. For a little more adventure, consult the section called “Up Your Vegetable Game” for options such as Roman-Style Stuffed Braised Artichokes or Sautéed Baby Bok Choy with Miso Sauce.

If you prefer beans and lentils, you could try Mashed Fava Beans with Cucumbers, Olives, and Feta, or for a fresh salad, toss together a colorful Cherry Tomato Salad with Basil and Fresh Mozzarella.

With 1,001 recipes, *The Side Dish Bible* covers all the bases—including sections for dinner parties, potlucks, and casseroles, as well as recipes that utilize the grill, slow cooker, or pressure cooker.

Here, **Life Extension®** features four recipes to get you started.

—LAURIE MATHENA

## Roasted Zucchini and Eggplant Medley

Serves 8

3 zucchini (about 1 1/2 pounds), quartered lengthwise and sliced crosswise into 3/4-inch-wide pieces

1/4 cup extra-virgin olive oil, divided, plus extra for serving

3/4 teaspoons table salt, divided

2 pinches pepper, divided

1 1/2 pounds eggplant, cut into 1-inch cubes

1 onion, chopped fine

1 tablespoon minced fresh thyme or 1 teaspoon dried

3 garlic cloves, minced

12 ounces cherry tomatoes, quartered

1/4 cup coarsely chopped fresh basil

1 tablespoon lemon juice

1. Adjust oven rack 6 inches from broiler element and heat broiler. Line rimmed baking sheet with aluminum foil and spray with vegetable oil spray.

2. Toss zucchini with 1 tablespoon oil, 1/4 teaspoon salt, and pinch pepper. Spread zucchini in even layer on prepared sheet. Broil zucchini, stirring occasionally, until lightly charred around edges but slightly underdone, 7 to 10 minutes; transfer zucchini to shallow serving dish (or casserole dish). Repeat with eggplant, 1 tablespoon oil, 1/4 teaspoon salt and remaining pinch pepper; transfer to serving dish.



3. Heat remaining 2 tablespoons oil in 12-inch nonstick skillet over medium heat until shimmering. Add onion, thyme, and remaining 1/4 teaspoon salt and cook until lightly browned, about 10 minutes. Stir in garlic and cook until fragrant, about 30 seconds. Off heat, stir in tomatoes. Scatter onion-tomato mixture over broiled vegetables. Cover vegetables and let sit for 10 minutes.

4. Sprinkle with basil, lemon juice, and additional oil before serving. Serve warm or at room temperature.



## Chickpea Salad with Carrots, Arugula, and Olives

Serves 4

2 (15-ounce) cans chickpeas, rinsed

1/4 cup extra-virgin olive oil

2 tablespoons lemon juice

3/4 teaspoon table salt

1/2 teaspoon pepper

Pinch cayenne pepper

3 carrots, peeled and shredded

1 ounce (1 cup) baby arugula, chopped

1/2 cup pitted kalamata olives, chopped

1. Microwave chickpeas in medium bowl until hot, about 1 minute 30 seconds. Stir in oil, lemon juice, salt, pepper, and cayenne and let sit for 30 minutes.

2. Add carrots, arugula, and olives and toss to combine. Season with salt and pepper to taste. Serve.

### VARIATIONS

#### Chickpea Salad with Fennel and Arugula

Substitute 1 fennel bulb, stalks discarded, bulb halved, cored, and cut into 1/4-inch pieces, for carrots and olives.

#### Chickpea Salad with Roasted Red Peppers and Feta

Substitute 1/2 cup drained and chopped jarred roasted red peppers, 1/2 cup crumbled feta cheese, and 1/4 cup chopped fresh parsley for carrots, arugula, and olives.



## Sautéed Green Beans with Mushrooms and Dukkah

Serves 4

5 teaspoons extra-virgin olive oil,  
divided

1 garlic clove, minced

2 tablespoons minced fresh parsley

1 teaspoon grated lemon zest plus  
2 teaspoons lemon juice

8 ounces cremini mushrooms,  
trimmed and sliced thin

3 shallots, halved and sliced thin

1/2 teaspoon table salt

1/8 teaspoon pepper

1 pound green beans, trimmed and  
cut into 2-inch lengths

1/4 cup water

1/3 cup organic plain low-fat yogurt

2 tablespoons dukkah  
(We prefer to use our homemade  
dukkah (see recipe opposite), but  
you can substitute store-bought  
dukkah if you wish.)

1. Combine 1 tablespoon oil, garlic, parsley, and lemon zest in bowl; set aside. Heat 1 teaspoon oil in 12-inch nonstick skillet over medium heat until shimmering. Add mushrooms, shallots, salt, and pepper, cover, and cook until mushrooms have released their liquid, about 5 minutes. Uncover, increase heat to high, and cook, stirring occasionally, until mushrooms are golden, about 8 minutes. Transfer to clean bowl.

2. Heat remaining 1 teaspoon oil in now-empty skillet over medium heat until shimmering. Add green beans

and cook, stirring occasionally, until spotty brown, 4 to 6 minutes. Add water, cover, and cook until green beans are bright green and still crisp, about 2 minutes.

3. Uncover, increase heat to high, and cook until water evaporates, 30 to 60 seconds. Stir in oil-garlic

mixture and mushrooms and cook until beans are crisp-tender, 1 to 3 minutes. Off heat, stir in lemon juice and season with salt and pepper to taste. Transfer to platter, drizzle with yogurt, and sprinkle with dukkah. Serve.





## Parsley-Cucumber Salad with Feta, Walnuts, and Pomegranate

Serves 4 to 6

- 3 tablespoons extra-virgin olive oil
- 1 tablespoon pomegranate molasses
- 1 tablespoon red wine vinegar
- 1/4 teaspoon table salt
- 1/8 teaspoon pepper
- Pinch cayenne pepper
- 3 cups fresh parsley leaves
- 1 English cucumber, halved lengthwise and sliced thin
- 1 cup walnuts, toasted and chopped coarse, divided
- 1/2 cup pomegranate seeds, divided
- 4 ounces feta cheese, sliced thin

Whisk oil, molasses, vinegar, salt, pepper, and cayenne in large bowl until fully incorporated. Add parsley and cucumber and toss to coat. Add half of walnuts and half of pomegranate seeds and toss to combine. Season with salt and pepper to taste. Transfer to platter and top with feta, remaining walnuts, and remaining pomegranate seeds. Serve.

## Dukkah

Makes 2 cups

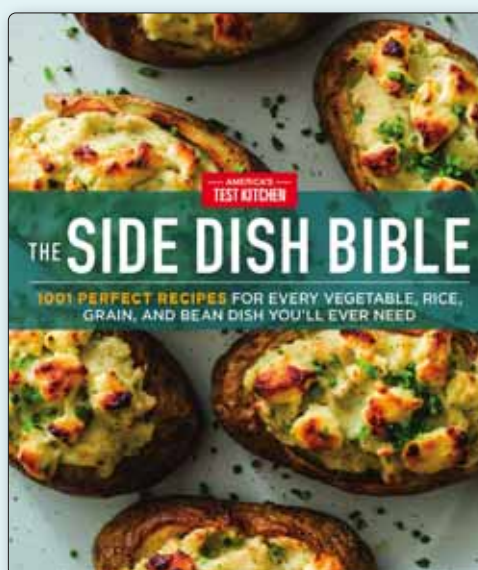
Dukkah is a Mediterranean condiment made from a blend of nuts, seeds, and spices. It makes a flavorful crunchy garnish for vegetables and salads.

- 1 (15-ounce) can chickpeas, rinsed and patted dry
- 1 teaspoon extra-virgin olive oil
- 1/2 cup shelled pistachios, toasted
- 1/3 cup black sesame seeds, toasted
- 2 1/2 tablespoons coriander seeds, toasted
- 1 tablespoon cumin seeds, toasted
- 2 teaspoons fennel seeds, toasted
- 1 1/2 teaspoons pepper
- 1 1/4 teaspoons table salt

Adjust oven rack to middle position and heat oven to 400 degrees. Toss chickpeas with oil and spread in single layer on rimmed baking sheet. Roast until browned and crisp, 40 to 45 minutes, stirring every 5-10 minutes; let cool completely.

Process chickpeas in food processor until coarsely ground, about 10 seconds; transfer to bowl. Pulse pistachios and sesame seeds in now-empty food processor until coarsely ground, about 15 pulses; transfer to bowl with chickpeas. Process coriander, cumin, and fennel seeds in again-empty food processor until finely ground, 2-3 minutes; transfer to bowl with chickpeas. Add pepper and salt and toss until well combined.

(Dukkah can be refrigerated for up to 1 month.)



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# Spelt

BY LAURIE MATHENA



## References

1. *Int J Clin Exp Med*. 2015;8(9):16978-83.
2. *Am J Cardiol*. 2015 Mar 1;115(5):625-9.
3. *Am J Clin Nutr*. 1999 Jan;69(1):30-42.
4. *Int J Environ Res Public Health*. 2015 Apr 29;12(5):4726-38.
5. *Arch Intern Med*. 2005 Jan 24;165(2):150-6.
6. *Eur J Epidemiol*. 2013 Nov;28(11):845-58.

Spelt is an ancient grain that was one of the first forms of wheat used to make bread. While it's been grown in Europe for hundreds of years, it only made its way to the United States about 100 years ago.

Because spelt has remained largely unaltered, it is considered to be a **healthier option** than ordinary wheat.

Spelt has more protein and fat than typical wheat, and it is a good source of fiber, iron, and zinc.

Two large meta-analyses found that having a high intake of whole grains like spelt, compared with a low intake, was associated with:

- **14%** reduced risk of stroke<sup>1</sup>
- **12%** reduced risk of coronary heart disease<sup>2</sup>

Consuming high-fiber foods like spelt has been shown to lower total and LDL (bad) cholesterol,<sup>3</sup> while increasing HDL (good) cholesterol.<sup>4</sup> And supplementation with fiber has been shown to lower blood pressure.<sup>5</sup>

Because whole grain foods can slow digestion and reduce blood sugar spikes, studies suggest that they can reduce the risk of diabetes. In fact, one study showed that having a high intake of whole grains was associated with a reduced risk of type II diabetes.<sup>6</sup>

Eating spelt could also help with weight management, since high fiber foods can help you feel fuller longer.

Spelt flour can be substituted for wheat flour in recipes, although it does have a nuttier flavor. You can also enjoy whole spelt grains as a side dish, breakfast cereal, or in stews.

Since spelt is a type of wheat, it does contain gluten. This means it should be avoided by anyone with a gluten sensitivity or a condition such as celiac disease.

Be sure to choose whole grain spelt as opposed to refined spelt, which has a high glycemic index and can cause a rapid spike in blood sugar levels.

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- 02147 Wellness Bar—Cookie Dough
- 02246 Wellness Code® Advanced Whey Protein Isolate Vanilla
- 02221 Wellness Code® Muscle Strength & Restore Formula
- 02127 Wellness Code® Plant Protein Complete & Amino Acid Complex
- 02261 Wellness Code® Whey Protein Concentrate Chocolate
- 02260 Wellness Code® Whey Protein Concentrate Vanilla
- 02243 Wellness Code® Whey Protein Isolate Chocolate
- 02242 Wellness Code® Whey Protein Isolate Vanilla

## AMINO ACIDS

- 01039 Arginine & Ornithine Capsules
- 00038 Arginine Ornithine Powder
- 01253 Branched Chain Amino Acids
- 01829 Carnosine
- 01671 D,L-Phenylalanine Capsules
- 01624 L-Arginine Caps
- 01532 L-Carnitine
- 00345 L-Glutamine
- 00141 L-Glutamine Powder
- 01678 L-Lysine
- 01827 Taurine
- 00133 Taurine Powder
- 00326 Tyrosine Tablets

## BLOOD PRESSURE & VASCULAR SUPPORT

- 01824 Advanced Olive Leaf Vascular Support with Celery Seed Extract
- 02004 Arterial Protect
- 70000 Blood Pressure Monitor Arm Cuff
- 70004 Blood Pressure Monitor Digital Wrist Cuff
- 02497 Endothelial Defense™ Pomegranate Plus
- 02320 NitroVasc™ Boost
- 00984 Optimal BP Management
- 01953 Pomegranate Complete
- 00956 Pomegranate Fruit Extract
- 02024 Triple Action Blood Pressure AM/PM
- 02102 VenoFlow™

## BONE HEALTH

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

## BRAIN HEALTH

- 01524 Acetyl-L-Carnitine
- 01974 Acetyl-L-Carnitine Arginate
- 01659 Citicoline® (CDP-Choline)
- 02321 Cognitex® Basics
- 02396 Cognitex® Elite
- 02397 Cognitex® Elite Pregnenolone
- 01540 DMAE Bitartrate (dimethylaminoethanol)
- 02006 Dopa-Mind™
- 02212 Focus Tea™
- 01658 Ginkgo Biloba Certified Extract™
- 01527 Huperzine A
- 00020 Lecithin Granules

- 02101 Memory Protect
- 00709 Migra-Eeze™
- 01603 Neuro-Mag® Magnesium L-Threonate Caps
- 02032 Neuro-Mag® Magnesium L-Threonate Powder
- 00888 Optimized Ashwagandha
- 01676 PS (Phosphatidylserine) Caps
- 02406 Quick Brain Nootropic
- 01327 Vinpocetine

## CHOLESTEROL MANAGEMENT

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

## DIGESTION SUPPORT

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

## ENERGY MANAGEMENT

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

## EYE HEALTH

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

## FISH OIL & OMEGAS

- 02311 Clearly EPA/DHA Fish Oil
- 00463 Flaxseed Oil
- 01937 Mega EPA/DHA
- 02218 Mega GLA Sesame Lignans
- 01983 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract
- 01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin



- 01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels
- 01985 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 enteric coated softgels
- 01984 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 enteric coated softgels
- 01986 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 240 softgels
- 01812 Provinal® Purified Omega-7
- 01640 Vegetarian DHA

#### FOOD

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

#### GLUCOSE MANAGEMENT

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

#### HEART HEALTH

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

#### HORMONE BALANCE

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

#### IMMUNE SUPPORT

- 02411 5 Day Elderberry Immune
- 00681 AHCC®
- 02302 Bio-Quercetin
- 02410 Black Elderberry + Vitamin C
- 01961 Enhanced Zinc Lozenges
- 01704 Immune Modulator with Tinofend®
- 00955 Immune Protect with PARACTIN®
- 02005 Immune Senescence Protection Formula™
- 29727 Kinoko® Gold AHCC
- 24404 Kinoko® Platinum AHCC
- 00316 Kyolic® Garlic Formula 102
- 00789 Kyolic® Reserve
- 01681 Lactoferrin (Apolactoferrin) Caps
- 01903 NK Cell Activator™
- 01394 Optimized Garlic
- 01309 Optimized Quercetin
- 01811 Peony Immune
- 00525 ProBoost Thymic Protein A
- 01708 Reishi Extract Mushroom Complex
- 01906 Standardized Cistanche
- 13685 Ten Mushroom Formula®
- 01097 Ultra Soy Extract
- 01561 Zinc Lozenges

#### INFLAMMATION MANAGEMENT

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

#### JOINT SUPPORT

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

#### KIDNEY & BLADDER SUPPORT

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

#### LIVER HEALTH & DETOXIFICATION

- 01922 Advanced Milk Thistle • 60 softgels
- 01925 Advanced Milk Thistle • 120 softgels
- 02240 Anti-Alcohol Complex
- 01651 Calcium D-Glucarate
- 00550 Chlorella
- 01571 Chlorophyllin
- 01522 Milk Thistle • 60 veg capsules
- 02402 FLORASSIST® Liver Restore™
- 01541 Glutathione, Cysteine & C

- 01393 HepatoPro
- 01608 Liver Efficiency Formula
- 01534 N-Acetyl-L-Cysteine
- 00342 PectaSol-C® Modified Citrus Pectin Powder
- 01080 PectaSol-C® Modified Citrus Pectin Capsules
- 01884 Silymarin
- 02361 SOD Booster

## LONGEVITY & WELLNESS

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

## MEN'S HEALTH

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

## MINERALS

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

## MISCELLANEOUS

- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

## MOOD & STRESS MANAGEMENT

- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine

- 02175 SAME (S-Adenosyl-Methionine)  
200 mg, 30 enteric coated vegetarian tablets
- 02176 SAME (S-Adenosyl-Methionine)  
400 mg, 30 enteric coated vegetarian tablets
- 02174 SAME (S-Adenosyl-Methionine)  
400 mg, 60 enteric coated vegetarian tablets

## MULTIVITAMINS

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

## NERVE & COMFORT SUPPORT

- 02202 ComfortMAX™
- 02303 PEA Discomfort Relief

## PERSONAL CARE

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

## PET CARE

- 01932 Cat Mix
- 01931 Dog Mix

## PROBIOTICS

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

## SKIN CARE

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80175 Advanced Probiotic-Fermented Eye Serum
- 80177 Advanced Retinol Serum
- 80152 Advanced 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  
 80176 Collagen Boosting Peptide Cream  
 80156 Collagen Boosting Peptide Serum  
 02408 Collagen Peptides for Skin & Joints  
 80169 Cucumber Hydra Peptide Eye Cream  
 80141 DNA Support Cream  
 80163 Eye Lift Cream  
 80123 Face Rejuvenating Anti-Oxidant Cream  
 80109 Hyaluronic Facial Moisturizer  
 80110 Hyaluronic Oil-Free Facial Moisturizer  
 80138 Hydrating Anti-Oxidant Facial Mist  
 00661 Hydroderm  
 80103 Lifting & Tightening Complex  
 80168 Melatonin Advanced Peptide Cream  
 80114 Mild Facial Cleanser  
 80172 Multi Stem Cell Hydration Cream  
 80159 Multi Stem Cell Skin Tightening Complex  
 80122 Neck Rejuvenating Anti-Oxidant Cream  
 80174 Purifying Facial Mask  
 80150 Renewing Eye Cream  
 80142 Resveratrol Anti-Oxidant Serum  
 01938 Shade Factor™  
 02129 Skin Care Collection Anti-Aging Serum  
 02130 Skin Care Collection Day Cream  
 02131 Skin Care Collection Night Cream  
 80166 Skin Firming Complex  
 02096 Skin Restoring Ceramides  
 80130 Skin Stem Cell Serum  
 80164 Skin Tone Equalizer  
 80143 Stem Cell Cream with Alpine Rose  
 80148 Tightening & Firming Neck Cream  
 80161 Triple-Action Vitamin C Cream  
 80162 Ultimate MicroDermabrasion  
 80173 Ultimate Peptide Serum  
 80160 Ultra Eyelash Booster  
 80101 Ultra Wrinkle Relaxer  
 80113 Under Eye Refining Serum  
 80104 Under Eye Rescue Cream  
 80171 Vitamin C Lip Rejuvenator  
 80129 Vitamin C Serum  
 80136 Vitamin D Lotion  
 80102 Vitamin K Cream

## SLEEP

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

01721 Optimized Tryptophan Plus  
 01444 Quiet Sleep  
 01445 Quiet Sleep Melatonin

## VITAMINS

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

## WEIGHT MANAGEMENT & BODY COMPOSITION

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

## WOMEN'S HEALTH

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



Item #02209 • 30 vegetarian capsules  
1 bottle \$18  
.....  
4 bottles \$16 each



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SEXUAL HEALTH SUPPORT FOR MEN


A **ginger-like** root extract found in **Male Vascular Sexual Support** promotes **blood flow** and supports **sexual response**.

Each capsule provides **100 mg** of **KaempMax™**, which is super-standardized ***Kaempferia parviflora***.

For full product description and to order  
**Male Vascular Sexual Support**, call 1-800-544-4440  
or visit [www.LifeExtension.com](http://www.LifeExtension.com)

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





# Does Your Fish Oil Provide Olive Polyphenols?

**Omega-3s** are widely used to protect heart health.

**Olive oil** also has vascular benefits.

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



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



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

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

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The Science of a Healthier Life®

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## IN THIS EDITION OF *LIFE EXTENSION*® MAGAZINE



### 7 WHEN DRUGS BECOME DIETARY SUPPLEMENTS

A **B-vitamin** prescription drug cost **\$340** until it became a **dietary supplement** that now costs only **\$20**.



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During cold and flu season, **zinc**, **elderberry**, and **vitamin C** help reduce *severity* and *duration* of respiratory illnesses.



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Low doses of the mineral **lithium** may slow progression of Alzheimer's and other neurodegenerative disorders.



### 44 ORAL COLLAGEN IMPROVES SKIN AND JOINTS

**Hydrolyzed collagen** boosts internal collagen production, enhancing skin appearance and improving joint function.



### 54 PRESERVE MUSCLE AND IMPROVE BODY COMPOSITION

Amino-acid-derived **HMB** improves muscle strength, growth, lean mass, and healthy body composition.



### 66 SYSTEMIC EFFECTS OF B VITAMINS

B vitamins provide systemic benefits including DNA repair, neurotransmitter synthesis, and healthy methylation.

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