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March 2023

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# What Keeps **William Shatner** So Young?

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#### References

1. *Med Res Rev.* 2019;39(5):1851-1891.
2. *ACS Omega.* 2022 Apr 19;7(15):12835-45.

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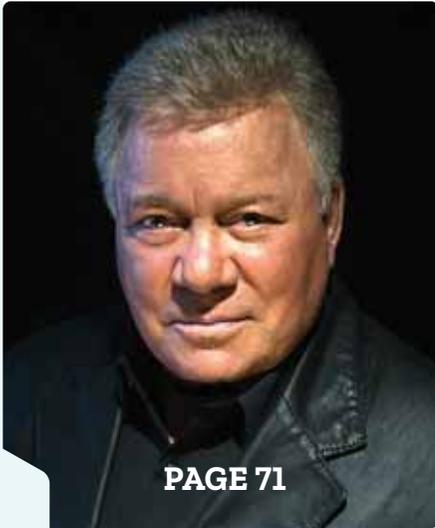


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**Kathy**

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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)

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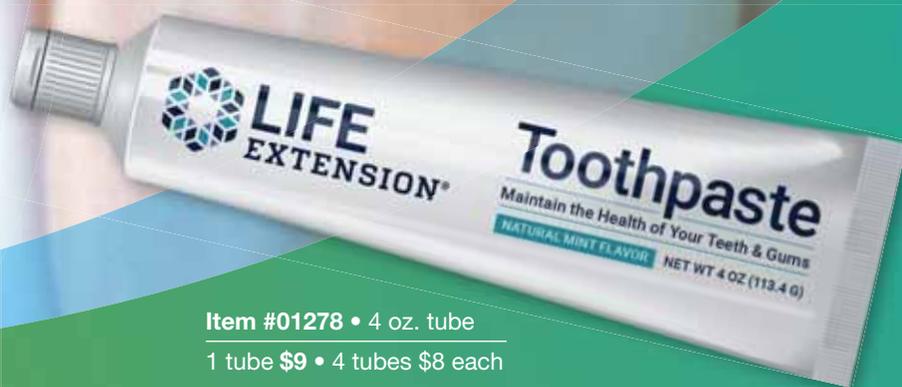
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LIFE EXTENSION (ISSN 1524-198X) Vol. 29, No. 3 ©2023 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. LE Publications, Inc. All rights reserved. Published 13 times 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. 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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#### References

1. *J Indian Soc Periodontol.* 2011 Jul;15(3):205-9.
2. *Br J Dermatol.* 2001 Oct;145(4):535-45.
3. *J Am Dent Assoc.* Jan 2013; 144(1): 21-30.
4. *J Clin Periodontol.* 1984 Oct;11(9):619-28.
5. *Ann Stomatol (Roma).* 2011 Mar-Jun; 2(3-4):10-8.

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# Impact of Vitamin D, Omega-3, and Simple Exercise on Cancer Risk



WILLIAM FALOON

Doctors have been obsessed with testing **single** interventions, be it a dietary supplement, drug, or lifestyle, to ascertain if meaningful **disease risk reductions** can be achieved.

If miraculous results are not discovered, the drug, nutrient, or healthy lifestyle is sometimes discredited by the clinical investigators and pessimistic media.

An *increasing* number of enlightened researchers are coming to the realization that to protect against **degenerative diseases** in humans, more than one concurrent **intervention** is needed.



For the first time ever, a tightly monitored, randomized controlled clinical trial investigated the combination of **vitamin D**, **omega-3s** and a simple **home exercise** program on **invasive cancer** risk in older **people**.

After only three years, there was an astounding **61%** reduced risk of **invasive cancers** in the **vitamin D + omega-3 + home exercise** group compared to **placebo**.<sup>1</sup>

This same study found smaller **cancer** hazard ratio reductions in groups receiving *only* **vitamin D (24%)**, or *only* **omega-3s (30%)** or *only* **home exercise (26%)**. But nothing compared with the robust **61%** reduced risk for **invasive cancer** when all three interventions were used together.<sup>1</sup>

**Invasive cancers** are malignancies that grow past the original site and spread to healthy tissues.<sup>2</sup> They generally require grueling treatments that often fail to completely cure.

A record **609,000** Americans will perish this year from malignant diseases.<sup>4</sup>

**Cancer prevention** is increasingly being prioritized by the medical mainstream. One reason is the toxicity and failure rates of conventional therapies.<sup>3</sup>

This editorial describes how low-cost **nutrients** and modest physical activity can protect against one of our most feared diseases.

Consumers are justifiably confused by what appear to be conflicting studies as they relate to the **anti-cancer** benefits of various lifestyles, diets, nutrients, and drugs.

A closer look at the data, however, reveals nuances that explain why benefits observed in some studies are not always replicated in what appear to be similar clinical trials.

Intervention trials that aim to block **multiple** pathways of cancer development are relatively rare. The concept of simultaneously combining several anti-cancer approaches has only recently been considered as it relates to meaningful **cancer prevention**.

### Vitamin D Should Be Taken Daily

Misunderstandings about supplements and healthy food choices contribute to mixed findings that are often erroneously sensationalized by media outlets.

For example, **vitamin D** is a fat-soluble nutrient that is **stored** in the body.

Because of this, many doctors today prescribe “bolus dosing,” which is high-dose vitamin D, administered weekly, monthly, or even annually. The doses are as high as **150,000 IU** every **three months** to **500,000 IU** every **year**.<sup>5</sup>

While these high periodic doses may ensure better patient compliance, it is not how the body normally obtains vitamin D.

Results from some human studies indicate that mega-dose vitamin D may increase serum concentration faster but there is no evidence to support decreased risk of falls, fractures, or bone mineral density.<sup>5,6</sup>

### Cancer Often Develops Slowly

Short-term studies of interventions designed to reduce cancer risk are suspect because some study subjects are likely harboring malignancies that have not yet reached clinical or symptomatic relevance.

We have previously cited examples of studies that exclude cancers diagnosed the first year and find more robust **cancer prevention** benefits in later years by improving calcium, vitamin D and other nutrient levels.<sup>7-9</sup>

Even the **cancer prevention** study described in the opening of this article lasted only **three years**. The researchers acknowledged this limited period might not fully reflect the longer-term benefits of **vitamin D + omega-3 + modest exercise**.

### Mechanisms of Cancer Prevention

**Chronic inflammation** is a contributor to the initiation and promotion of common **malignancies**.

Human studies have shown an association between reduced incidence of advanced cancer with vitamin D supplementation,<sup>10</sup> a therapeutic role of omega-3s against certain types of cancers,<sup>11</sup> and the impact of exercise on reducing cancer risk.<sup>12,13</sup>





Two small, human trials found that combined supplementation with **vitamin D** and **omega-3s** resulted in significant reductions in markers of **inflammation**, **oxidative stress**,<sup>14</sup> and **tumor cell activity**.<sup>15</sup>

Mechanistic research has identified the potential of cancer protective pathways in response to **vitamin D**,<sup>16-19</sup> **omega-3s**,<sup>20-27</sup> and **exercise**.<sup>12,13</sup>

For instance, **vitamin D** downregulates **growth factors** that fuel cancer.<sup>16-19</sup> Vitamin D also regulates **genes** that protect against cancer cell propagation.<sup>17</sup>

**Omega-3** fatty acids impede cancer development by inhibiting chronic **inflammation**, suppressing **angiogenesis**,<sup>20-29</sup> and inducing tumor cell **apoptosis** (programmed cell death).<sup>20-22,25-27,29</sup>

Preclinical data suggest **physical activity** helps protect against **tumor progression**.<sup>30</sup> Increased physical activity can induce **tumor cell apoptosis** and increase an *enzyme* in cells called **AMPK** that helps downregulate cellular proliferation.<sup>31,32</sup>

## Huge Clinical Trial

The cumulative benefits of vitamin D + omega-3s + modest exercise were amply demonstrated in the **largest** clinical trial of its type, resulting in robust reductions in invasive cancer incidence. This provides promising documentation of the beneficial effects available when nutrients and lifestyle are combined, rather than studied one at a time, in isolation.<sup>1</sup>

## Modest Amounts of Nutrients and Exercise

An interesting nuance about this interventional study is that the researchers used an algae-sourced omega-3 supplement providing **333 mg** of **EPA** and **667 mg** of **DHA** per daily dose.<sup>1</sup>

**Vitamin D3** was used in this study at the modest dose of **2,000 IU** daily.

The **exercise** regimen was very basic, did not require sophisticated equipment, and was easily incorporated into a home lifestyle program with only a minimal time commitment.

I will describe how to engage in this easy exercise program at the end of this article.

## Will More Interventions Work Better?

We've published extensive articles in **Life Extension Magazine**<sup>®</sup> about **improving** the efficacy of **vitamin D** by ensuring adequate **magnesium** and **vitamin K** intake.

**Magnesium** by itself has demonstrated reductions of **cancer risk** in observational studies.<sup>33-36</sup> One reason may be that **magnesium** activates **vitamin D** in the body.<sup>37</sup>

**Vitamin K** possesses additive and synergistic properties with vitamin D. These include helping to maintain **bone density**<sup>38</sup> and anti-cancer properties supporting apoptosis.<sup>39-41</sup>

Maintaining skeletal structure is essential to help guard against tumor cell **degradation** of bone that causes the release of potent **growth factors** that stimulate cancer cell proliferation.<sup>42,43</sup>

It would be fascinating to see results of a large **human** trial that combined:

- **Vitamin D3**
- **Omega-3s**
- **Magnesium**
- **Vitamin K2**
- **Modest exercise**
- **AMPK-activating** compounds (like metformin, hesperidin, gynostemma and curcumin), and an
- **Optimized (healthy) diet**

### Affordable Cancer Prevention

There will be enormous societal benefits if the **risk reduction** findings from the combined interventions study (**vitamin D + omega-3s + modest exercise**) transition to the general population.

These benefits include substantial reductions in cancer incidence, reduced need for expensive/toxic treatments, and prevention of needless deaths.

These interventions are not expensive.

In fact, if one were to add up the exorbitant costs of conventional oncology treatments, the government might save money by providing supplements at no charge to underprivileged Americans that contain in two capsules: vitamin D3 and omega-3s, with vitamin K2 and some magnesium.

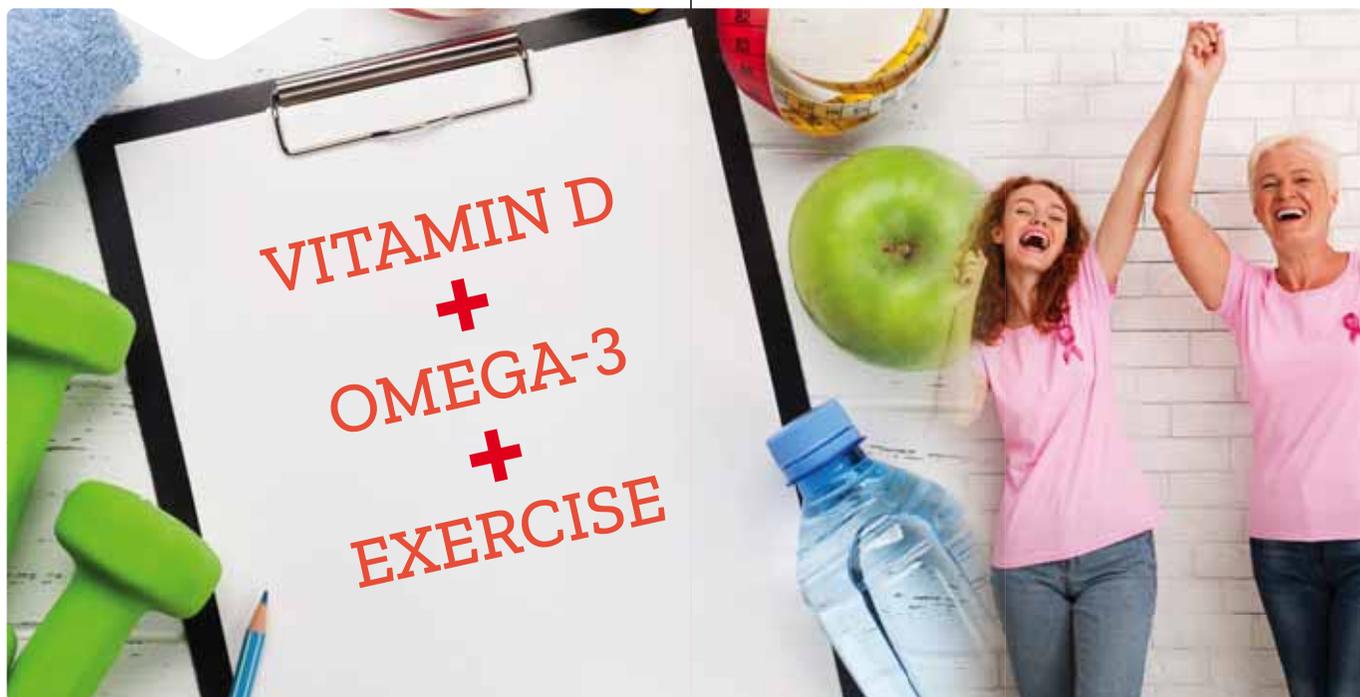
I've long argued that today's healthcare cost crisis could be mitigated if more aggressive **prevention** strategies were consistently adopted.

Most of you have been supplementing with potent doses of the **nutrients** that contributed to this **61% reduction** in **invasive cancers**. This was the first and largest tightly controlled prevention study of its kind.

For longer life,



William Faloon, Co-Founder,  
Life Extension®



The following appears to be a very basic exercise regimen, easily incorporated into a lifestyle program requiring no sophisticated equipment and only a minimal time commitment.

**DO-HEALTH**  
**Simple Exercise Program (SHEP)<sup>1</sup>**

In the DO Health Study a simple home exercise program (SHEP) was implemented. The program included five exercises to be performed five times per week. The average time needed to complete the program was 30 minutes.

The SHEP was developed by Bischoff-Ferrari, et al. at the Center on Aging and Mobility, University of Zurich, Switzerland.

See [heike.bischoff@usz.ch](mailto:heike.bischoff@usz.ch) for further information.

**1 Leg Strength (3 x 10 Repetitions)**

1



**2 Single Leg Stand Balance (10 x 10 seconds each leg)**

2



**3 Arms and Back Strength (3 x 10 Repetitions)**

3



**4 Shoulder and Back Strength (3 x 10 Repetitions)**

4



**5 Stair Climbing Exercise (3 x 10 Repetitions)**

5



Image credit: D0-HEALTH Trial Collaborators<sup>44</sup>  
 Used with permission of Dr. Bischoff-Ferrari<sup>1,29</sup>

SHEP (Strength Exercise)	Control Exercise (Flexibility Exercise)
1. Sit-to-stand (quadriceps/hip extension strength training)	1. Hip and knee mobility (seated position)
2. One-leg stance (hip muscles strength training plus static balance training)	2. Hip mobility (standing position)
3. Pull Backs against elastic resistance (seated position)	3. Trunk and chest mobility (seated position)
4. External shoulder rotation against elastic resistance (seated position)	4. Shoulder mobility (seated position)
5. Steps	5. Ankle mobility (standing position)

SHEP (Strength) 30 minutes 3 times a week compared to a control exercise program (Flexibility) 30 min 3 times a week.<sup>29</sup>

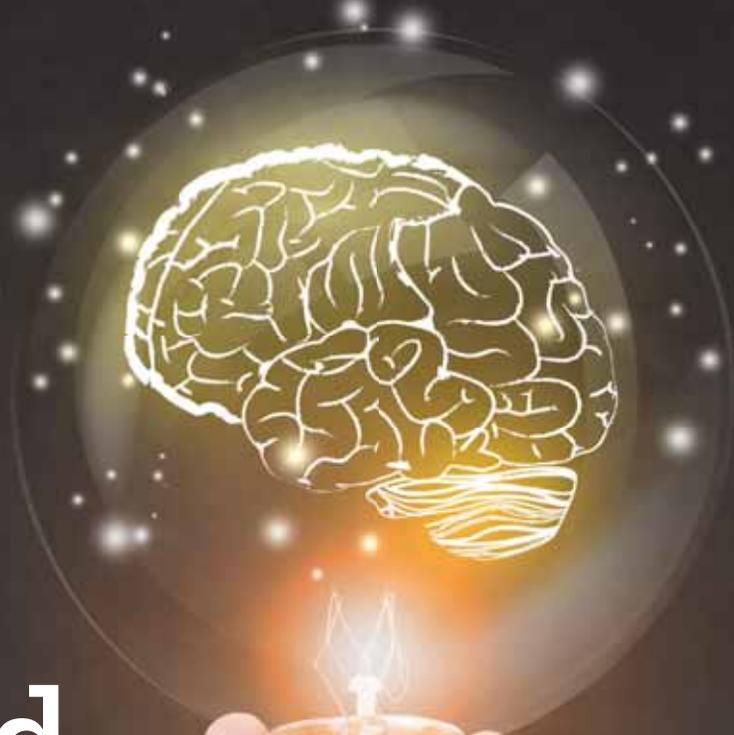
## References

- Bischoff-Ferrari HA, Willett WC, Manson JE, et al. Combined Vitamin D, Omega-3 Fatty Acids, and a Simple Home Exercise Program May Reduce Cancer Risk Among Active Adults Aged 70 and Older: A Randomized Clinical Trial. *Front Aging*. 2022 April;25;3:852643.
- Patel A. Benign vs Malignant Tumors. *JAMA Oncology*. 2020;6(9):1488-.
- Maeda H, Khatami M. Analyses of repeated failures in cancer therapy for solid tumors: poor tumor-selective drug delivery, low therapeutic efficacy and unsustainable costs. *Clin Transl Med*. 2018 Mar 1;7(1):11.
- Available at: <https://www.cancer.org/research/cancer-facts-statistics/all-cancer-facts-figures/cancer-facts-figures-2022.html>. Accessed November, 29, 2022.
- Zheng YT, Cui QQ, Hong YM, et al. A Meta-Analysis of High Dose, Intermittent Vitamin D Supplementation among Older Adults. *PLoS ONE*. 2015;10(1):e0115850.
- Narvaez J, Maldonado G, Guerrero R, et al. Vitamin D Megadose: Definition, Efficacy in Bone Metabolism, Risk of Falls and Fractures. *Open Access Rheumatol*. 2020;12:105-15.
- Lappe JM, Travers-Gustafson D, Davies KM, et al. Vitamin D and calcium supplementation reduces cancer risk: results of a randomized trial. *Am J Clin Nutr*. 2007 Jun;85(6):1586-91.
- Zheng Y, Zhu J, Zhou M, et al. Meta-analysis of long-term vitamin D supplementation on overall mortality. *PLoS One*. 2013;8(12):e82109.
- Henn M, Martin-Gorgojo V, Martin-Moreno JM. Vitamin D in Cancer Prevention: Gaps in Current Knowledge and Room for Hope. *Nutrients*. 2022 Oct 27;14(21).
- Chandler PD, Chen WY, Ajala ON, et al. Effect of Vitamin D3 Supplements on Development of Advanced Cancer: A Secondary Analysis of the VITAL Randomized Clinical Trial. *JAMA Netw Open*. 2020 Nov 2;3(11):e2025850.
- Nabavi SF, Bilotto S, Russo GL, et al. Omega-3 polyunsaturated fatty acids and cancer: lessons learned from clinical trials. *Cancer Metastasis Rev*. 2015 Sep;34(3):359-80.
- Matthews CE, Moore SC, Arem H, et al. Amount and Intensity of Leisure-Time Physical Activity and Lower Cancer Risk. *J Clin Oncol*. 2020 Mar 1;38(7):686-97.
- Moore SC, Lee IM, Weiderpass E, et al. Association of Leisure-Time Physical Activity With Risk of 26 Types of Cancer in 1.44 Million Adults. *JAMA Intern Med*. 2016 Jun 1;176(6):816-25.
- Jamilian M, Samimi M, Mirhosseini N, et al. The influences of vitamin D and omega-3 co-supplementation on clinical, metabolic and genetic parameters in women with polycystic ovary syndrome. *J Affect Disord*. 2018 Oct 1;238:32-8.
- Haidari F, Abiri B, Irvani M, et al. Effects of Vitamin D and Omega-3 Fatty Acids Co-Supplementation on Inflammatory Factors and Tumor Marker CEA in Colorectal Cancer Patients Undergoing Chemotherapy: A Randomized, Double-Blind, Placebo-Controlled Clinical Trial. *Nutr Cancer*. 2020;72(6):948-58.
- Sundaram S, Chaudhry M, Reardon D, et al. The vitamin D3 analog EB 1089 enhances the antiproliferative and apoptotic effects of adriamycin in MCF-7 breast tumor cells. *Breast Cancer Res Treat*. 2000 Sep;63(1):1-10.
- Campbell MJ, Elstner E, Holden S, et al. Inhibition of proliferation of prostate cancer cells by a 19-nor-hexafluoride vitamin D3 analogue involves the induction of p21waf1, p27kip1 and E-cadherin. *J Mol Endocrinol*. 1997 Aug;19(1):15-27.
- Jiang F, Bao J, Li P, et al. Induction of ovarian cancer cell apoptosis by 1,25-dihydroxyvitamin D3 through the down-regulation of telomerase. *J Biol Chem*. 2004 Dec 17;279(51):53213-21.
- James SY, Mackay AG, Colston KW. Effects of 1,25 dihydroxyvitamin D3 and its analogues on induction of apoptosis in breast cancer cells. *J Steroid Biochem Mol Biol*. 1996 Jul;58(4):395-401.
- Larsson SC, Kumlin M, Ingelman-Sundberg M, et al. Dietary long-chain n-3 fatty acids for the prevention of cancer: a review of potential mechanisms. *Am J Clin Nutr*. 2004 Jun;79(6):935-45.
- Arita K, Kobuchi H, Utsumi T, et al. Mechanism of apoptosis in HL-60 cells induced by n-3 and n-6 polyunsaturated fatty acids. *Biochem Pharmacol*. 2001 Oct 1;62(7):821-8.
- Sun H, Hu Y, Gu Z, et al. Omega-3 fatty acids induce apoptosis in human breast cancer cells and mouse mammary tissue through syndecan-1 inhibition of the MEK-Erk pathway. *Carcinogenesis*. 2011 Oct;32(10):1518-24.
- D'Eliseo D, Manzi L, Merendino N, et al. Docosahexaenoic acid inhibits invasion of human RT112 urinary bladder and PT45 pancreatic carcinoma cells via down-modulation of granzyme B expression. *J Nutr Biochem*. 2012 May;23(5):452-7.
- Park M, Kim H. Anti-cancer Mechanism of Docosahexaenoic Acid in Pancreatic Carcinogenesis: A Mini-review. *J Cancer Prev*. 2017 Mar;22(1):1-5.
- Gu Z, Suburu J, Chen H, et al. Mechanisms of omega-3 polyunsaturated fatty acids in prostate cancer prevention. *Biomed Res Int*. 2013;2013:824563.
- Calviello G, Serini S, Piccioni E. n-3 polyunsaturated fatty acids and the prevention of colorectal cancer: molecular mechanisms involved. *Curr Med Chem*. 2007;14(29):3059-69.
- Serini S, Trombino S, Oliva F, et al. Docosahexaenoic acid induces apoptosis in lung cancer cells by increasing MKP-1 and down-regulating p-ERK1/2 and p-p38 expression. *Apoptosis*. 2008 Sep;13(9):1172-83.
- Donat-Vargas C, Berglund M, Glynn A, et al. Dietary polychlorinated biphenyls, long-chain n-3 polyunsaturated fatty acids and incidence of malignant melanoma. *Eur J Cancer*. 2017 Feb;72:137-43.
- Bischoff-Ferrari HA, de Godoi Rezende Costa Molino C, Rival S, et al. DO-HEALTH: Vitamin D3 - Omega-3 - Home exercise - Healthy aging and longevity trial - Design of a multinational clinical trial on healthy aging among European seniors. *Contemp Clin Trials*. 2021 Jan;100:106124.
- Rundqvist H, Velica P, Barbieri L, et al. Cytotoxic T-cells mediate exercise-induced reductions in tumor growth. *Elife*. 2020 Oct 23;9.
- Wang Q, Zhou W. Roles and molecular mechanisms of physical exercise in cancer prevention and treatment. *J Sport Health Sci*. 2021 Mar;10(2):201-10.
- Zheng A, Zhang L, Yang J, et al. Physical activity prevents tumor metastasis through modulation of immune function. *Frontiers in Pharmacology*. 2022 2022-October-12;13.
- Shah SC, Zhu X, Dai Q, et al. Magnesium intake is associated with a reduced risk of incident liver cancer, based on an analysis of the NIH-American Association of Retired Persons (NIH-AARP) Diet and Health Study prospective cohort. *Am J Clin Nutr*. 2021 Mar 11;113(3):630-8.
- Qu X, Jin F, Hao Y, et al. Nonlinear association between magnesium intake and the risk of colorectal cancer. *Eur J Gastroenterol Hepatol*. 2013 Mar;25(3):309-18.
- Chen GC, Pang Z, Liu QF. Magnesium intake and risk of colorectal cancer: a meta-analysis of prospective studies. *Eur J Clin Nutr*. 2012 Nov;66(11):1182-6.
- Gorczyca AM, He K, Xun P, et al. Association between magnesium intake and risk of colorectal cancer among postmenopausal women. *Cancer Causes Control*. 2015 Dec;26(12):1761-9.
- Uwitonze AM, Razzaque MS. Role of Magnesium in Vitamin D Activation and Function. *J Am Osteopath Assoc*. 2018 Mar 1;118(3):181-9.
- van Ballegooijen AJ, Pilz S, Tomaschitz A, et al. The Synergistic Interplay between Vitamins D and K for Bone and Cardiovascular Health: A Narrative Review. *Int J Endocrinol*. 2017;2017:7454376.
- Xu W, Wu H, Chen S, et al. Cytotoxic effects of vitamins K1, K2, and K3 against human T lymphoblastoid leukemia cells through apoptosis induction and cell cycle arrest. *Chem Biol Drug Des*. 2020 Oct;96(4):1134-47.
- Shibayama-Imazu T, Aiuchi T, Nakaya K. Vitamin K2-mediated apoptosis in cancer cells: role of mitochondrial transmembrane potential. *Vitam Horm*. 2008;78:211-26.
- Xv F, Chen J, Duan L, et al. Research progress on the anticancer effects of vitamin K2. *Oncol Lett*. 2018 Jun;15(6):8926-34.
- Le Pape F, Vargas G, Clézardin P. The role of osteoclasts in breast cancer bone metastasis. *Journal of Bone Oncology*. 2016 2016/09/01;5(3):93-5.
- Fornetti J, Welm AL, Stewart SA. Understanding the Bone in Cancer Metastasis. *Journal of Bone and Mineral Research*. 2018;33(12):2099-113.
- Available at: <https://www.usz.ch/en/do-health-gruuev/>. Accessed December, 5, 2022.

"Good stuff!"

Steven

VERIFIED CUSTOMER REVIEW



# Bodyguard for Your Brain

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

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

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(1,000 mcg of lithium per tiny cap)

Item #02403

100 vegetarian capsules

1 bottle \$12

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Each bottle lasts 100 days.



GLUTEN FREE

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

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# Broccoli

## THE TREE OF LIFE

Just one daily **Optimized Broccoli and Cruciferous Blend** tablet provides cell-protective compounds found in fresh vegetables.

For maximum absorption each **enteric coated** tablet contains two layers:

- **Myrosinase** to release **sulforaphane** in the small intestine, in one layer,
- **DIM** (3, 3-diindolymethane) to promote healthy estrogen balance, and
- **Glucoraphanin** from broccoli, watercress, cabbage and rosemary (sulforaphane precursors), in the other layer.



"I feel this has made the difference! My hormones seem to be falling into place."

MJ

VERIFIED CUSTOMER REVIEW

Item #02368 • 30 enteric coated vegetarian tablets

1 bottle \$28.50 • 4 bottles \$26.50 each



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# In the News



## Coffee Drinking Associated with Reduced Risk of Cardiovascular Disease and Death

A large, prospective cohort study published in *European Journal of Preventive Cardiology* showed that drinking coffee was associated with reduced risk of cardiovascular disease and mortality.\*

Researchers followed 449,563 people averaging 58 years old for 12 years to determine the best kind of coffee for preventing heart disease and boosting longevity.

They evaluated ground, instant, and decaffeinated.

**All** types of coffee were associated with a reduced risk of cardiovascular disease and death, but **ground coffee** produced the greatest benefits.

As compared to non-coffee drinkers overall reduction in cardiovascular incidents was observed.

Drinking **2-3 cups** of ground coffee per day led to a **27%** reduced risk of death whereas consumption of **4-5 cups** reduced the risk of arrhythmias by **17%**.

**Editor's note:** Research has shown that drinking coffee improves endothelial function and lowers the chance of heart failure.

\* *European Journal of Preventive Cardiology*, Volume 29, Issue 17, November 2022, Pages 2240–2249.

## Senolytics May Protect Against Adverse Effects of Radiation Therapy

Senolytics may play a protective role against long-term side effects of radiation therapy used to treat cancer, according to a study published in *eLife*.\*

Senescence describes a condition in which aged, dysfunctional cells stop dividing yet survive to create a harmful, proinflammatory environment.

In this preclinical trial, mice that got radiation either received *low dose Navitoclax* or a combination of **dasatinib** with **quercetin** for 10 days. Another group received **metformin** for 10 weeks.

Animals that received **senolytics** within a month following irradiation showed a reduction in frailty progression, better muscle and liver function, and greater short-term memory compared to untreated mice.

Metformin was similarly as effective as senolytics. Rather than killing senescent cells, metformin prevents the proliferation of senescence in neighboring cells.

**Editor's Note:** Senolytic therapies that kill senescent cells or metformin may improve quality of life in people receiving radiation therapy. There is also evidence that the AMPK-activating property of metformin may impede cancer cell proliferation.

\* *eLife* 11:e75492.





## Vitamins A, C, D, E Linked to Lower Risk of Respiratory Illness and Mortality

A pooled analysis concluded that having lower serum levels of vitamins C and E were associated with greater risk of respiratory diseases, and that lower levels of vitamins A, C, and D were associated with an increased risk of dying from these diseases, the journal *Respiratory Research* reported.\*

Lower serum vitamin C levels were associated with a greater risk of wheeze. Among smokers, lower levels of the alpha-tocopherol form of vitamin E were associated with increased wheeze and chronic bronchitis/emphysema.

Among smokers a higher risk of death from chronic lower respiratory disease (asthma, bronchitis, or emphysema) and influenza/pneumonia was associated with lower levels of **vitamin D**. Greater influenza and pneumonia mortality was also associated with lower vitamin A levels. Vitamin C deficiency doubled the risk of dying from these conditions.

**Editor's Note:** The data were compiled from 16,218 participants in the National Health and Nutrition Examination Survey III (NHANES III), conducted from 1988 to 1994, and 17,838 who participated from 1999 to 2006.

\* *Respir Res.* 2022 Jun 9;23(1):150.

## Older Adults with Sarcopenia Benefit from Leucine-Rich Protein Supplements

Results from a meta-analysis of randomized trials concluded that protein supplements rich in the essential branched-chain amino acid leucine could improve muscle strength in individuals with sarcopenia, characterized by muscle wasting that contributes to frailty in aging people, according to an article in *Archives of Gerontology and Geriatrics*.\*

A total of six studies, including 699 men and women with sarcopenia were included in the analysis. A daily protein supplement containing **3 grams to 6 grams** of leucine was given to 346 participants for 8 to 13 weeks, while 353 received a placebo or no leucine. Muscle strength, muscle mass, and physical performance were evaluated before and after the treatment periods.

Muscle strength significantly improved in leucine-supplemented participants as a primary outcome in comparison with the control groups. There was also a trend toward improvement in muscle mass and physical performance.

**Editor's Note:** Leucine-rich protein supplementation improves muscle strength in sarcopenic older adults and can be suggested as a nutritional treatment for sarcopenia.

\* *Arch Gerontol Geriatr.* 2022 Sep-Oct;102: 104758.



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# 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

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FOR A VIBRANT YOU

If you want to be young at heart—and of mind—you need to have plenty of cellular energy. Your mitochondria supply that energy, but as you age, mitochondrial function begins to decline.

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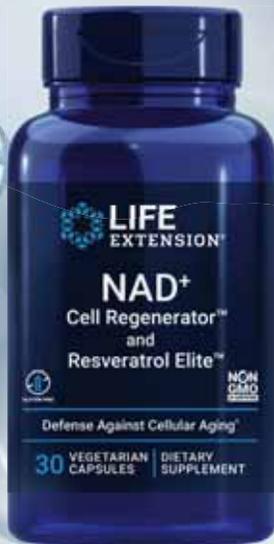
1 bottle \$24 | 4 bottles \$18 each



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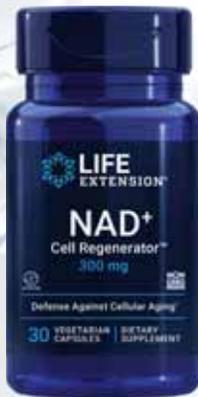
30 vegetarian capsules

1 bottle \*

**Resveratrol** activates longevity proteins called **sirtuins**.

**NAD<sup>+</sup>** enables cellular **sirtuins** to **function**.

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**Nancy**

VERIFIED CUSTOMER REVIEW

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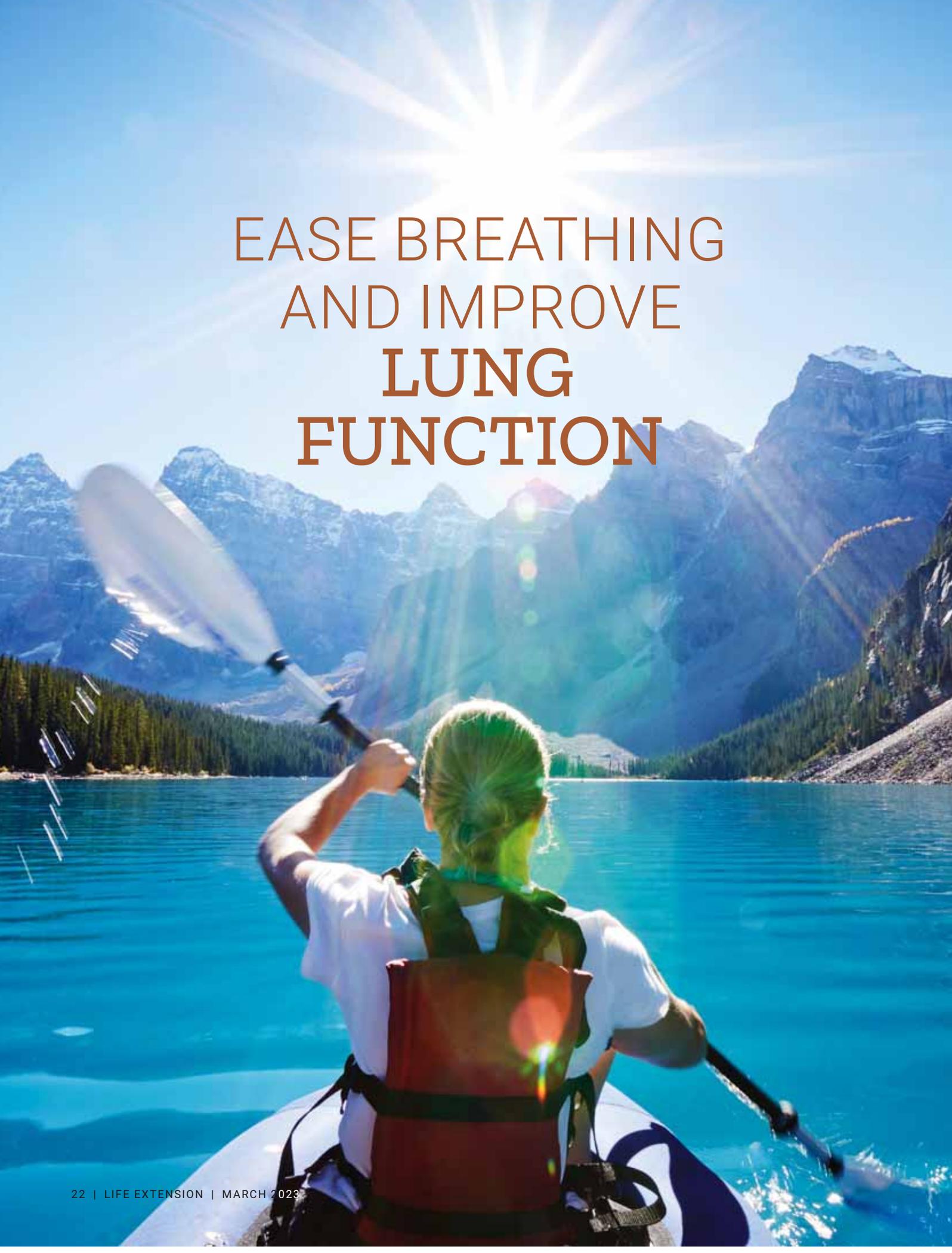
\* For pricing available to readers of this magazine, call 1-800-544-4440 or visit [LifeExtension.com/NAD](http://LifeExtension.com/NAD)

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A person with blonde hair tied back, wearing a white t-shirt and a green life vest, is seen from behind, paddling a white kayak on a vibrant turquoise lake. The sun is high in the sky, creating a bright lens flare effect. In the background, there are majestic, snow-capped mountains and a dense forest of evergreen trees. The overall scene is bright and scenic, suggesting a peaceful outdoor activity.

# EASE BREATHING AND IMPROVE LUNG FUNCTION



BY MICHAEL DOWNEY

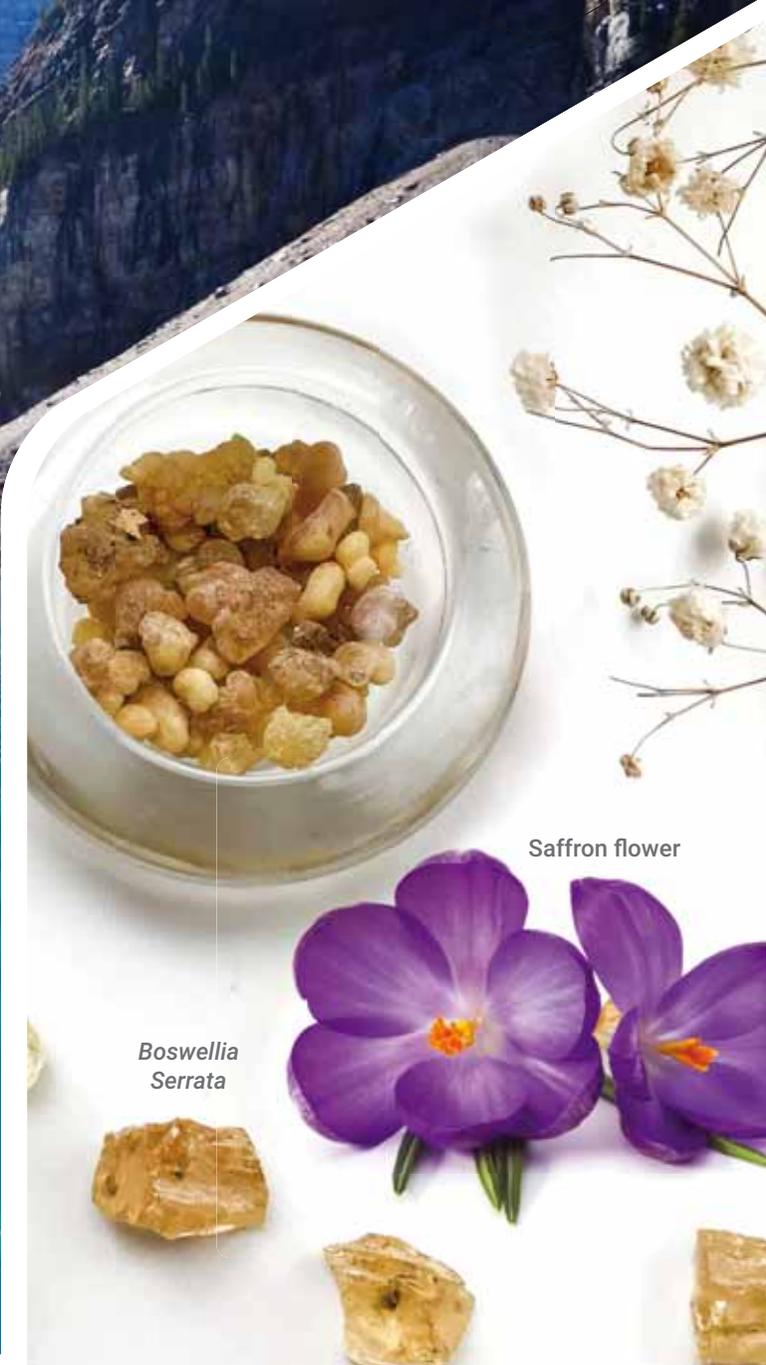
With age, lung function begins to decline.<sup>1-3</sup>

The problem is further exacerbated by exposure to secondhand smoke and air pollution.

This decline threatens overall health, quality of life, and **lifespan**.<sup>2</sup>

Scientists have identified four **plant-derived** ingredients that can help counter this decline.

**Human** studies have validated significant improvements in **lung function**.



Saffron flower

*Boswellia Serrata*

Over **40%** of Americans live in areas with poor air quality. Pollution levels correlate with increased rates of **lung disease**.<sup>4-6</sup>

For example:<sup>4</sup>

- Ohio has the country's **worst** air quality—and a **lung disease** prevalence of **15.5%**.
- Hawaii has the country's **best** air quality—and a **lung disease** prevalence of just **3.5%**.
- Lung symptoms of air pollution exposure can include coughing, breathing difficulties, congestion and worse.
- Excessive air pollution can result in development of respiratory conditions, including **asthma** and **chronic obstructive pulmonary disease (COPD)**.

## Key Nutrients Can Help

Scientists have identified **four** plant-derived compounds that improve lung health as follows:<sup>7-16</sup>

- **Boswellia serrata** and **Aegle marmelos** improved breathing and lung function in *healthy adults* sensitive to pollution,<sup>8</sup>
- **Boswellia serrata**, **Aegle marmelos**, and **saffron** were shown to **improve** breathing ability in *asthmatics*,<sup>7,9,10</sup> and
- In preclinical studies, **andrographolide** has been shown to **reduce** smoke-induced lung damage.<sup>14-16</sup>

### BOSWELLIA-BAEL FRUIT BLEND

*Boswellia serrata* is a plant found in Arabia and India. It has shown benefits for several conditions, including **asthma**.<sup>17</sup>

**Bael fruit** is a shrub native to the Indian subcontinent and southeast Asia. Its fruit and seeds are used in traditional medicine for various disorders.<sup>18</sup>

An equal **blend** of extracts of these plants was shown, in a clinical trial, to *alleviate* asthma symptoms and to provide a clinically meaningful improvement in **lung health** parameters.<sup>7</sup>

In one study, scientists enlisted healthy adults with self-described **sensitivity to air pollution**.<sup>8</sup>

This trial included a group that took a **placebo**, while another group took **200 mg** daily of the **Boswellia-Bael** blend. After just three weeks, the group that received the **Boswellia-Bael** combination had some improved lung function. After **six weeks**, they had a:<sup>8</sup>

- **30.2%** improvement in **total air exhaled** during a spirometry test (which measures lung capacity, or how much air you can breathe into or out of your lungs),
- **16.4%** improvement in air forced out in the *first second*, a measure of air movement through larger airways, and
- **7.4%** improvement in **aerobic exercise capacity**, measured by average speed walked during a six-minute period (from **3.36 mph** to **3.5 mph**).

COPD and asthma can require use of inhalers for coughing, wheezing, or troubled breathing during a flare-up. For this reason, they are also called rescue drugs or rescue inhalers.

A second study investigated the effect of the same blend in subjects who suffered from mild to moderate **bronchial asthma**. One group took a placebo, while the other took **100 mg** of the **Boswellia-Bael** blend **twice** daily.<sup>7</sup>



*Andrographis paniculata*

The treatment group experienced improved breathing and reduced use of inhalers, including a:<sup>7</sup>

- **50.17%** improvement in **peak expiratory flow rate**, a measure of the maximum amount of air a person can push out of their lungs when exhaling forcefully, after eight weeks, and
- **44%** decrease in the use of a “rescue” **asthma inhaler** after four weeks.

The improvements were attributed to the extracts’ **anti-inflammatory** activity.<sup>7</sup>

### SAFFRON

The spice **saffron** has long been used in traditional medicine for respiratory ailments and to counter inflammation, among other purposes.<sup>10</sup>

Eighty adults with mild to moderate **asthma** were enrolled in a placebo-controlled trial. After taking **50 mg of saffron** twice daily for **eight weeks**, the treatment group had:<sup>9,10</sup>

- **50%** less waking at night due to asthma symptoms,
- **40%** less “rescue” inhaler use,
- **36.8%** less activity limitation, and
- **33.8%** less shortness of breath during the night.

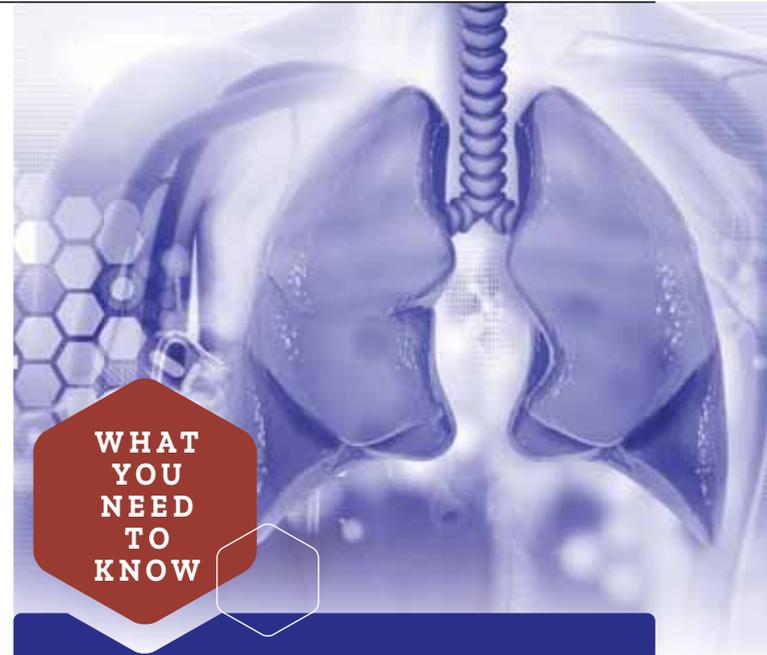
Saffron also reduced biomarkers of **inflammation** (such as C-reactive protein).<sup>10,19-21</sup> Animal data show that saffron has relaxing effects on the smooth muscle of the **trachea** (windpipe) as an additional mechanism of supporting breathing/lung function.<sup>19-25</sup>

### ANDROGRAPHOLIDE

The compound **andrographolide** is extracted from the stem and leaves of *Andrographis paniculata*. It has been used in traditional Indian medicine and is best known for supporting **immunity**.<sup>26</sup>

Cell and animal models of smoke- or pollution-induced lung toxicity suggest that andrographolide may protect against **lung damage**. It appears to do so by:<sup>11,13-16</sup>

- Inhibiting **DNA damage**,
- Protecting against **oxidative stress**, and
- Reducing **inflammation**.



## Breathe Easy as You Age

- Beginning around age 25-35, lung function begins to decline with each passing year. Respiratory health is further damaged by air pollution.
- Scientists identified **four** plant-derived ingredients that enhance lung health: *Boswellia serrata*, Bael fruit, saffron, and andrographolide.
- Human studies show that a blend of **Boswellia** and **Bael fruit extracts** improved breathing and boosted lung function in healthy individuals, as well as people with sensitivity to air pollution or those with asthma.
- A clinical study shows that **saffron** extract increased breathing capacity and reduced symptoms in those suffering from asthma.
- Preclinical data suggest that **andrographolide** could protect lungs against pollution and smoke.

A combination of **Boswellia-Bael blend**, **saffron**, and **andrographolide** may help protect lung function and promote better breathing well into older age.

## Summary

Aging, declining lung function, and air pollution can damage **lungs** and cause breathing difficulties. Researchers have identified **four** plant-based ingredients that protect healthy lung function.

A blend of **Boswellia** and **Bael fruit** extracts was clinically shown to improve breathing and relieve asthma symptoms.

**Saffron** extract was clinically demonstrated to improve asthma.

**Andrographolide** was found in preclinical research to protect against lung damage from pollutants and smoke.

Together, these ingredients may help preserve vital lung function and breathing capacity. •

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

- Sharma G, Goodwin J. Effect of aging on respiratory system physiology and immunology. *Clin Interv Aging*. 2006;1(3):253-60.
- Bowdish DME. The Aging Lung: Is Lung Health Good Health for Older Adults? *Chest*. 2019 Feb;155(2):391-400.
- Available at: <https://www.lung.org/lung-health-diseases/how-lungs-work/lung-capacity-and-aging>. Accessed December, 7, 2022.
- Available at: <https://www.lung.org/research/trends-in-lung-disease/prevalence-incidence-lung-disease>. Accessed December, 7, 2022.
- Available at: <https://worldpopulationreview.com/state-rankings/air-quality-by-state>. Accessed December, 7, 2022.
- Available at: <https://www.npr.org/2022/04/21/1093205632/air-quality-pollution-state-of-air-report>. Accessed December, 7, 2022.
- Yugandhar P, Rao KM, Sengupta K. A novel herbal composition containing extracts of *Boswellia serrata* gum resin and *Aegle marmelos* fruit alleviates symptoms of asthma in a placebo controlled double-blind clinical study. *Phytother Res*. 2018 Jan;32(1):140-50.
- PLT. Alviolife. 2022.
- Zilae M, Hosseini SA, Jafarirad S, et al. An evaluation of the effects of saffron supplementation on the asthma clinical symptoms and asthma severity in patients with mild and moderate persistent allergic asthma: a double-blind, randomized placebo-controlled trial. *Respir Res*. 2019 Feb 22;20(1):39.
- Hosseini SA, Zilae M, Shoushtari MH, et al. An evaluation of the effect of saffron supplementation on the antibody titer to heat-shock protein (HSP) 70, hsCRP and spirometry test in patients with mild and moderate persistent allergic asthma: A triple-blind, randomized placebo-controlled trial. *Respir Med*. 2018 Dec;145:28-34.
- Tan WSD, Liao W, Peh HY, et al. Andrographolide simultaneously augments Nrf2 antioxidant defense and facilitates autophagic flux blockade in cigarette smoke-exposed human bronchial epithelial cells. *Toxicol Appl Pharmacol*. 2018 Dec 1;360:120-30.
- Liao W, Lim AYH, Tan WSD, et al. Restoration of HDAC2 and Nrf2 by andrographolide overcomes corticosteroid resistance in chronic obstructive pulmonary disease. *Br J Pharmacol*. 2020 Aug;177(16):3662-73.

## How Breathing Problems Develop

Proper **lung function** is essential to overall health.<sup>2</sup> But starting around age **35**, lung function declines at a rate of **1%-2%** yearly.<sup>1</sup>

That's because **aging** causes changes that can decrease lung capacity:<sup>3</sup>

- Diaphragm muscles weaken,
- The tissue that keeps airways open loses elasticity, making airways smaller, and
- Rib cage bones decrease in size, leaving less room for lungs to expand.

Deterioration of breathing capacity affects every cell in the body. This age-related decline may be accelerated by other factors, including inflammation and **air pollution**.

- Luo W, Jia L, Zhang JW, et al. Andrographolide Against Lung Cancer—New Pharmacological Insights Based on High-Throughput Metabolomics Analysis Combined with Network Pharmacology. *Front Pharmacol*. 2021;12:596652.
- Tan WS, Peh HY, Liao W, et al. Cigarette Smoke-Induced Lung Disease Predisposes to More Severe Infection with Nontypeable Haemophilus influenzae: Protective Effects of Andrographolide. *J Nat Prod*. 2016 May 27;79(5):1308-15.
- Yang D, Zhang W, Song L, et al. Andrographolide protects against cigarette smoke-induced lung inflammation through activation of heme oxygenase-1. *J Biochem Mol Toxicol*. 2013 May;27(5):259-65.
- Guan SP, Tee W, Ng DS, et al. Andrographolide protects against cigarette smoke-induced oxidative lung injury via augmentation of Nrf2 activity. *Br J Pharmacol*. 2013 Apr;168(7):1707-18.
- Ernst E. Frankincense: systematic review. *BMJ*. 2008 Dec 17;337:a2813.
- Available at: <https://hort.purdue.edu/newcrop/CropFactSheets/bael.html>. Accessed December, 7, 2022.
- Neamati A, Boskabady MH. Effect of *Crocus sativus* (Saffron) on Muscarinic Receptors of Guinea Pig Tracheal Chains. 2010.
- Boskabady MH, Aslani MR. Relaxant effect of *Crocus sativus* (saffron) on guinea-pig tracheal chains and its possible mechanisms. *J Pharm Pharmacol*. 2006 Oct;58(10):1385-90.
- Boskabady MH, Seyedhosseini Tamijani SM, Rafatpanah H, et al. The effect of *Crocus sativus* extract on human lymphocytes' cytokines and T helper 2/T helper 1 balance. *J Med Food*. 2011 Dec;14(12):1538-45.
- Nemati H, Boskabady MH, Ahmadzadeh Vostakolaei H. Stimulatory effect of *Crocus sativus* (saffron) on beta2-adrenoceptors of guinea pig tracheal chains. *Phytomedicine*. 2008 Dec;15(12):1038-45.
- Boskabady MH, Tabatabaee A, Byrami G. The effect of the extract of *Crocus sativus* and its constituent safranal, on lung pathology and lung inflammation of ovalbumin sensitized guinea-pigs. *Phytomedicine*. 2012 Jul 15;19(10):904-11.
- Byrami G, Boskabady MH, Jalali S, et al. The effect of the extract of *Crocus sativus* on tracheal responsiveness and plasma levels of IL-4, IFN- $\gamma$ , total NO and nitrite in ovalbumin sensitized guinea-pigs. *J Ethnopharmacol*. 2013 May 20;147(2):530-5.
- Mokhtari-Zaer A, Khazdair MR, Boskabady MH. Smooth muscle relaxant activity of *Crocus sativus* (saffron) and its constituents: possible mechanisms. *Avicenna J Phytomed*. 2015 Sep-Oct;5(5):365-75.
- Okhurobo A, Falodun JE, Erharuyi O, et al. Harnessing the medicinal properties of *Andrographis paniculata* for diseases and beyond: a review of its phytochemistry and pharmacology. *Asian Pac J Trop Dis*. 2014 Jun;4(3):213-22. doi: 10.1016/S2222-1808(14)60509-0.



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**Maury**

VERIFIED CUSTOMER REVIEW

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# BREATHE EASY

**Lung** health is adversely impacted by aging and environmental exposures.

**Healthy Lungs** contains **four** plant-derived compounds to support **optimal lung** function:<sup>1</sup>

- ***Boswellia serrata***<sup>1,2</sup>
- **Bengal quince**,<sup>1,2</sup>
- **Saffron**,<sup>3,4</sup>
- **Andrographolide**<sup>1</sup>

Studies have shown these nutrients can:

- Improve breathing capacity.
- Assist healthy adults sensitive to environmental exposure.<sup>1</sup>
- Promote lung function.<sup>2-4</sup>



**Healthy Lungs • Item #02512**  
30 vegetarian capsules  
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(one capsule per day)

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

References: 1. PLT Study. 2022. Unpublished. Data on file. 2. *Phytother Res.* 2018 Jan;32(1):140-50.  
3. *Respir Res.* 2019 Feb 22;20(1):39. 4. *Respir Med.* 2018 Dec;145:28-34.

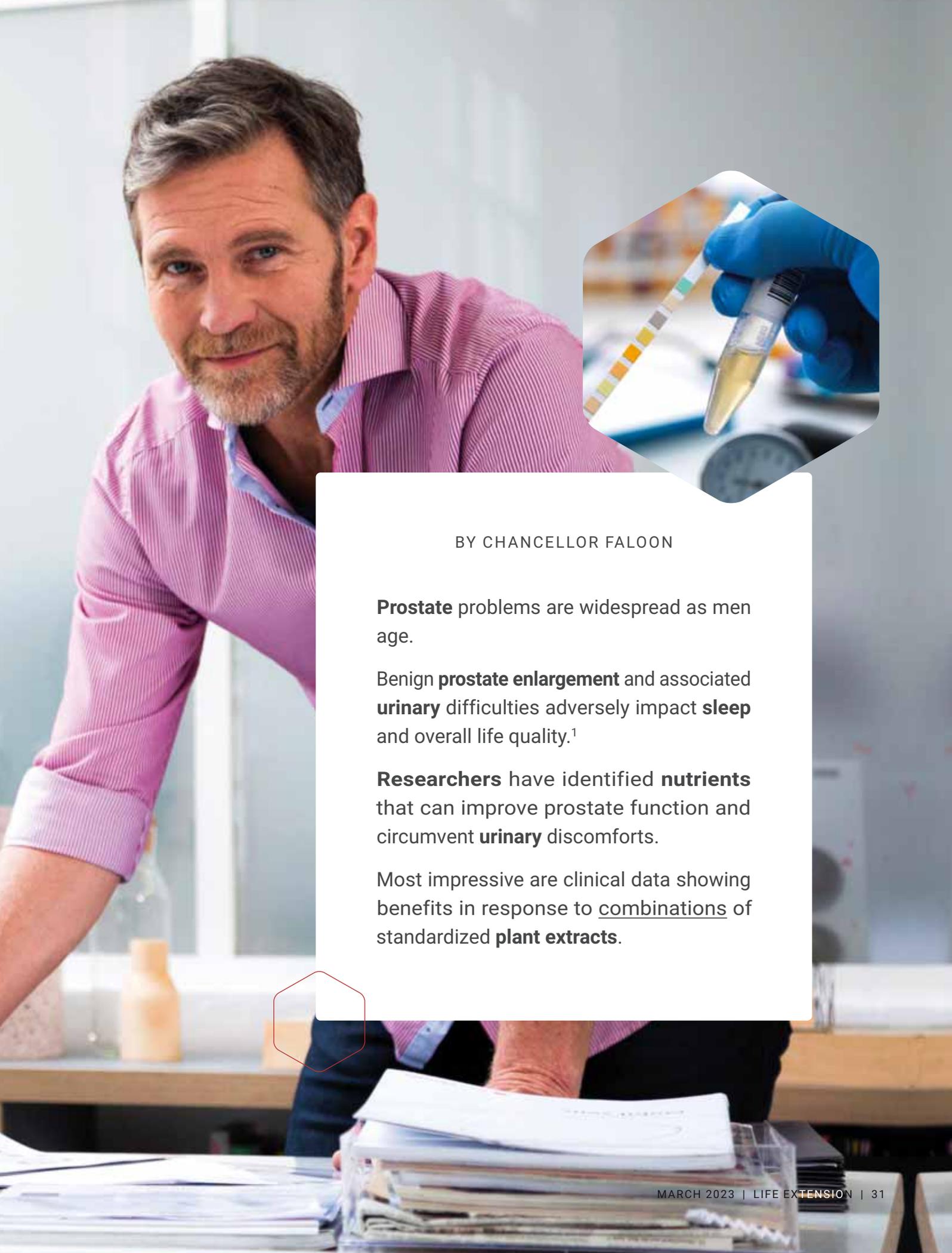
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IMPROVE  
URINARY FLOW  
BY ENHANCING  
**PROSTATE  
FUNCTION**





BY CHANCELLOR FALOON

**Prostate** problems are widespread as men age.

Benign **prostate enlargement** and associated **urinary** difficulties adversely impact **sleep** and overall life quality.<sup>1</sup>

**Researchers** have identified **nutrients** that can improve prostate function and circumvent **urinary** discomforts.

Most impressive are clinical data showing benefits in response to combinations of standardized **plant extracts**.

## Consequences of an Aging Prostate

The **prostate** is a walnut-size gland located just below the bladder in men.<sup>1</sup>

**Prostate cancer** is prevalent in aging males<sup>2</sup> but non-malignant prostate disorders are more widespread.<sup>1</sup>

**Benign prostate hyperplasia (BPH)** affects about 8% of men in their 40s and gradually worsens to more than 80% as men age past 79 years.<sup>3</sup>

Those afflicted with BPH may experience **lower urinary tract symptoms**, including the sudden need to urinate, frequent urination, waking often during the night to urinate, difficulty urinating, and similar symptoms.<sup>4</sup>

Medications are available to alleviate BPH, but many men do not tolerate their side effects.

Several nutrients have been shown to reduce urinary symptoms *without* side effects.

### SAW PALMETTO AND BETA-SITOSTEROL

**Saw palmetto** is a plant native to Florida and has long been used as a drug in Europe to alleviate urinary symptoms associated with BPH.<sup>5</sup>

A systematic review published in 2020 compared **saw palmetto extract** with the drug **tamsulosin** in over 1,000 men with **BPH**.<sup>6</sup>

After at least six months of treatment, **saw palmetto** showed comparable benefits to **tamsulosin** (with the exception of prostate volume), but *without* the common side effects of tamsulosin, like ejaculation disorders and decreased libido.

Saw palmetto's effects may be *enhanced* when its active component, **beta-sitosterol**, is extracted and taken with it. Beta-sitosterol is a compound that is believed to reduce levels of the hormone **dihydrotestosterone (DHT)**,<sup>7</sup> which at high levels is linked to an **enlarged prostate**.<sup>8</sup>

In a randomized, controlled trial, men with **BPH** who took **500 mg** of beta-sitosterol-enriched **saw palmetto** oil daily for 12 weeks had significantly improved symptoms and reduced **PSA** (prostate specific antigen) levels.<sup>9</sup> High PSA levels can indicate an enlarged prostate or possible prostate cancer.<sup>10</sup>

In another trial, patients with chronic **prostatitis** who took saw palmetto daily for 12 weeks had significantly improved urinary health scores, including reduced pelvic pain and discomfort.<sup>11</sup>

**Prostatitis**, or inflammation of the prostate is frequently caused by bacterial infections. It may cause similar **urinary symptoms**, along with fever, sexual dysfunction, and pelvic pain.<sup>1,12</sup>

### NETTLE EXTRACTS

Extracts of the dwarf and stinging **nettle plants** can provide a range of prostate benefits.<sup>13</sup>

**Nettle extracts** exert anti-microbial effects to reduce **prostatitis** risk.<sup>14</sup> They also enable some reduction in prostate size, improvement in urinary flow, and reduced residual urine in the bladder.<sup>15,16</sup>

In a clinical trial, 60 men with **benign prostate hyperplasia** took either **stinging nettle root** extract



Saw Palmetto



Stinging Nettle



Pumpkin Seeds

or a **placebo** daily for 12 weeks. Those taking the **nettle extract** had reduced **inflammation** and improved **urinary health scores**.<sup>17</sup>

An evaluation was done of **four** randomized controlled studies of 922 patients with moderate-to-severe **prostate** symptoms. Findings from this analysis showed significantly **more** men responded positively to the combination of **saw palmetto** and **nettle extracts**, compared to **placebo**. The majority of those who responded experienced a reduction of one urination episode per night.<sup>18</sup>

A combination of **saw palmetto** and **nettle** extracts is popular in European medicine to improve urinary symptoms in aging men.<sup>19</sup>

### PUMPKIN SEED

**Pumpkin seeds** have been used to promote urinary health around the world for centuries.<sup>20</sup>

In one controlled clinical trial, the combination of **pumpkin seed** and **saw palmetto** oils resulted in an over **40%** reduction in **PSA** levels, compared to baseline. The improvement was evident after three months and continued throughout the one-year trial.

In this trial, supplementation with either pumpkin seed or saw palmetto oils or both, resulted in improvement in quality-of-life scores.<sup>21</sup>

### PYGEUM AFRICANUM

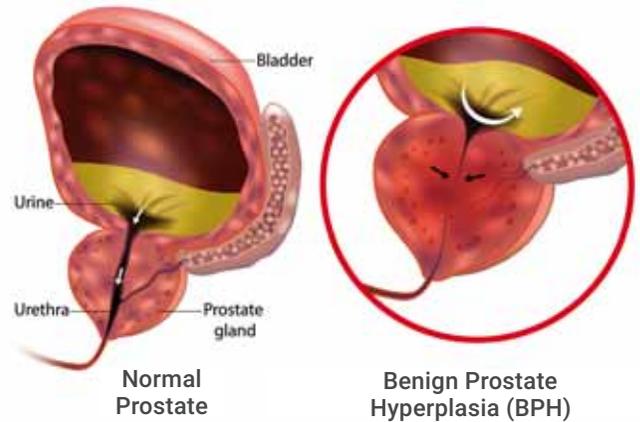
The bark of *Pygeum africanum*, the African prune tree, contains compounds that support prostate and bladder health.

In a rigorous meta-analysis of **18** controlled trials, men taking **Pygeum** were more than **twice** as likely as placebo users to report an improvement in BPH symptoms.<sup>22</sup>

In a **clinical trial** of men with **BPH**, taking *Pygeum* extract twice daily for two months, compared to baseline, resulted in a:

- **40%** improvement in prostate symptoms score,
- **31%** improvement in quality of life, and
- **32%** reduction in nocturnal urinary frequency.<sup>23</sup>

*Pygeum* has been used in Europe for decades as a medication to improve urinary symptoms in men with BPH.<sup>22</sup>



## Relief for Prostate Problems

- **Benign prostatic hyperplasia** and **prostatitis** are common diseases of the prostate gland that are frequent causes of urinary problems in men.
- Multiple **plant extracts** and **compounds** have been shown to prevent and relieve symptoms of these diseases, without side effects that may come with medications, and may even reduce risk of **prostate cancer**.

### BOSWELLIA

*Boswellia serrata*, also known as Indian frankincense, has been used for centuries in traditional Indian medicine to treat inflammatory conditions.

Preclinical research has shown that it can:

- Induce death in **prostate cancer** cells,<sup>24,25</sup>
- Decrease formation of androgen receptors that many prostate cancers require to survive, and<sup>26</sup>
- Inhibit the growth of blood vessels that tumors need to metastasize.<sup>27</sup>

Clinical studies are needed to evaluate how these beneficial functional effects may impact prostate cancer risk and outcomes in aging men.

### FLOWER POLLEN

Research suggests that **flower pollen** benefits the prostate by relaxing smooth muscle tissue in the urinary tract and potentially alleviating **lower urinary tract symptoms**.<sup>28,29</sup>

One study found that a **ryegrass pollen extract** worked as well as six different drugs commonly used for **benign prostate hyperplasia**.<sup>30</sup>

In a preclinical study, **flower pollen extract** reduced harmful activity of altered prostate cells, which suggested it could benefit **prostatitis** and have a possible **prostate cancer** preventative effect.<sup>31</sup>

### NORWAY SPRUCE

Research has shown that *increased* dietary intake of **lignans**, polyphenols found in many plants, correlates with *reduced* **prostate cancer** risk.<sup>32-34</sup>

The **Norway spruce** contains particularly high amounts of lignans.

In preclinical studies, Norway spruce lignans reduced **prostate tumor** volume and increased the death of cancer cells. Other Norway spruce extracts reduced **lower urinary tract symptoms** in a model of chronic **prostatitis**.<sup>35,36</sup>

In the body, lignans convert into a compound called **enterolactone**,<sup>37</sup> which may promote hormonal changes associated with lower prostate cancer risk.<sup>38,39</sup>

An epidemiological study found that those with the *highest* **enterolactone** levels were **60%** less likely to have **prostate cancer** than those with low levels.<sup>33</sup>

### BORON

**Boron** is a mineral with benefits throughout the body.<sup>40</sup>

Preclinical research in mice found that boron can decrease the size of existing **prostate tumors**.

In addition, a large survey showed that the risk of prostate cancer was **52% lower** in those whose daily boron intake averaged **1.8 mg** compared to those who consumed **0.9 mg** or less.<sup>40</sup>



Pygeum Africanum



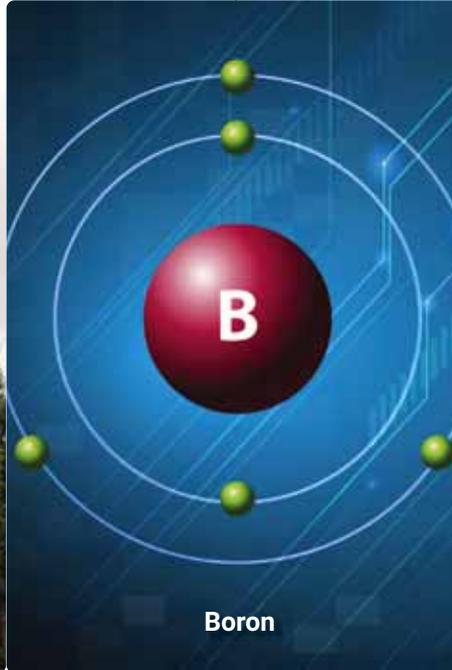
Boswellia



Ryegrass Flower Pollen



Norway Spruce



Boron



Lycopene

## LYCOPENE

**Lycopene** is a carotenoid found in many plants, including tomatoes.<sup>41</sup> One meta-analysis found that *higher* lycopene intake was associated with reduced risk of prostate cancer.<sup>42</sup>

Other research has found that increased **lycopene** intake is associated with decreased prostate size,<sup>41,43</sup> and reduced risk for prostate cancer development *and* progression.<sup>43,44</sup>

## Summary

Many men over **age 40** deal with persistent **urinary** discomforts mostly caused by **benign prostate hyperplasia** and sometimes **prostatitis**.

A large volume of published scientific data demonstrates benefits in response to certain nutrients individually.

Even more impressive is evidence showing significant results when these **plant extracts** are taken in combination.

Some of these nutrients possess mechanisms that may help protect against prostate cancer development. ●

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

- Available at: <https://www.cancer.gov/types/prostate/understanding-prostate-changes#:~:text=The%20three%20most%20common%20prostate%20problems%20are%20inflammation,does%20not%20increase%20your%20risk%20of%20prostate%20cancer>. Accessed December, 1, 2022.
- Siegel RL, Miller KD, Fuchs HE, et al. Cancer statistics, 2022. *CA: A Cancer Journal for Clinicians*. 2022;72(1):7-33.
- Nimeh T, Magnan B, Almallah YZ. Benign Prostatic Hyperplasia: Review of Modern Minimally Invasive Surgical Treatments. *Semin Intervent Radiol*. 2016 Sep;33(3):244-50.
- Devlin CM, Simms MS, Maitland NJ. Benign prostatic hyperplasia - what do we know? *BJU Int*. 2021 Apr;127(4):389-99.
- Available at: <https://www.herbalgram.org/resources/expanded-commission-e/saw-palmetto-berry/>. Accessed December, 9, 2022.
- Cai T, Cui Y, Yu S, et al. Comparison of Serenoa repens With Tamsulosin in the Treatment of Benign Prostatic Hyperplasia: A Systematic Review and Meta-Analysis. *Am J Mens Health*. 2020 Mar-Apr;14(2):1557988320905407.
- Zamani P, Mokhtari O, Dehghanian F. Identification of Beta-Sitosterol and Stigmasterol as Possible Inhibitors of 5 Alpha-Reductase 1: An In-Silico Study. 2021;1(1):e121545.
- Madersbacher S, Sampson N, Culig Z. Pathophysiology of Benign Prostatic Hyperplasia and Benign Prostatic Enlargement: A Mini-Review. *Gerontology*. 2019;65(5):458-64.
- Sudeep HV, Thomas JV, Shyamprasad K. A double blind, placebo-controlled randomized comparative study on the efficacy of phytosterol-enriched and conventional saw palmetto oil in mitigating benign prostate hyperplasia and androgen deficiency. *BMC Urol*. 2020 Jul 3;20(1):86.
- Available at: <https://www.cancer.org/cancer/prostate-cancer/detection-diagnosis-staging/tests.html#:~:text=About%2015%25%20of%20men%20with,prostate%20cancer%20is%20over%2050%25>. Accessed December, 9, 2022.
- Zhang K, Guo RQ, Chen SW, et al. The efficacy and safety of Serenoa repens extract for the treatment of patients with chronic prostatitis/chronic pelvic pain syndrome: a multicenter, randomized, double-blind, placebo-controlled trial. *World J Urol*. 2021 Sep;39(9):3489-95.
- Khan FU, Ihsan AU, Khan HU, et al. Comprehensive overview of prostatitis. *Biomed Pharmacother*. 2017 Oct;94:1064-76.

13. Mohammadi A, Mansoori B, Aghapour M, et al. Urtica dioica dichloromethane extract induce apoptosis from intrinsic pathway on human prostate cancer cells (PC3). *Cell Mol Biol (Noisy-le-grand)*. 2016 Mar 31;62(3):78-83.
14. Cai T, Mazzoli S, Bechi A, et al. Serenoa repens associated with Urtica dioica (ProstaMEV) and curcumin and quercetin (FlogMEV) extracts are able to improve the efficacy of prulifloxacin in bacterial prostatitis patients: results from a prospective randomised study. *Int J Antimicrob Agents*. 2009 Jun;33(6):549-53.
15. Safarinejad MR. Urtica dioica for treatment of benign prostatic hyperplasia: a prospective, randomized, double-blind, placebo-controlled, crossover study. *J Herb Pharmacother*. 2005;5(4):1-11.
16. Chrubasik JE, Roufogalis BD, Wagner H, et al. A comprehensive review on the stinging nettle effect and efficacy profiles. Part II: urticae radix. *Phytomedicine*. 2007 Aug;14(7-8):568-79.
17. Akbar Karami A, Sheikhsoleimani M, Reza Memarzadeh M, et al. Urtica Dioica Root Extract on Clinical and Biochemical Parameters in Patients with Benign Prostatic Hyperplasia, Randomized Controlled Trial. *Pak J Biol Sci*. 2020 Jan;23(10):1338-44.
18. Oelke M, Berges R, Schlafke S, et al. Fixed-dose combination PRO 160/120 of sabal and urtica extracts improves nocturia in men with LUTS suggestive of BPH: re-evaluation of four controlled clinical studies. *World J Urol*. 2014 Oct;32(5):1149-54.
19. Koch E. Extracts from fruits of saw palmetto (*Sabal serrulata*) and roots of stinging nettle (*Urtica dioica*): viable alternatives in the medical treatment of benign prostatic hyperplasia and associated lower urinary tracts symptoms. *Planta Med*. 2001 Aug;67(6):489-500.
20. Batool M, Ranjha M, Roobab U, et al. Nutritional Value, Phytochemical Potential, and Therapeutic Benefits of Pumpkin (*Cucurbita* sp.). *Plants (Basel)*. 2022 May 24;11(11).
21. Hong H, Kim CS, Maeng S. Effects of pumpkin seed oil and saw palmetto oil in Korean men with symptomatic benign prostatic hyperplasia. *Nutr Res Pract*. 2009 Winter;3(4):323-7.
22. Wilt T, Ishani A, Mac Donald R, et al. Pygeum africanum for benign prostatic hyperplasia. *Cochrane Database Syst Rev*. 2002;1998(1):CD001044.
23. Breza J, Dzurny O, Borowka A, et al. Efficacy and acceptability of tadenan (Pygeum africanum extract) in the treatment of benign prostatic hyperplasia (BPH): a multicentre trial in central Europe. *Curr Med Res Opin*. 1998;14(3):127-39.



24. Lu M, Xia L, Hua H, et al. Acetyl-keto-beta-boswellic acid induces apoptosis through a death receptor 5-mediated pathway in prostate cancer cells. *Cancer Res*. 2008 Feb 15;68(4):1180-6.
25. El Gaafary M, Büchele B, Syrovets T, et al. An  $\alpha$ -acetoxo-tirucallic acid isomer inhibits Akt/mTOR signaling and induces oxidative stress in prostate cancer cells. *J Pharmacol Exp Ther*. 2015 Jan;352(1):33-42.
26. Yuan HQ, Kong F, Wang XL, et al. Inhibitory effect of acetyl-11-keto-beta-boswellic acid on androgen receptor by interference of Sp1 binding activity in prostate cancer cells. *Biochem Pharmacol*. 2008 Jun 1;75(11):2112-21.
27. Saraswati S, Pandey M, Mathur R, et al. Boswellic acid inhibits inflammatory angiogenesis in a murine sponge model. *Microvasc Res*. 2011 Nov;82(3):263-8.
28. El-Khatib FM, Yafi NR, Yafi FA. Over-the-Counter Supplements and Men's Health. In: Yafi FA, Yafi NR, editors. *Effects of Lifestyle on Men's Health*: Academic Press; 2019:281-300.
29. Chambliss WG. A Critical Review of Graminex Flower pollen extract for Symptomatic Relief Of Lower Urinary Tract Symptoms (LUTS) in Men. 2010.
30. Li NC, Wu SL, Jin J, et al. [Comparison of different drugs on the treatment of benign prostate hyperplasia]. *Zhonghua Wai Ke Za Zhi*. 2007 Jul 15;45(14):947-50.
31. Locatelli M, Macchione N, Ferrante C, et al. Graminex Pollen: Phenolic Pattern, Colorimetric Analysis and Protective Effects in Immortalized Prostate Cells (PC3) and Rat Prostate Challenged with LPS. *Molecules*. 2018 May 11;23(5).
32. Low YL, Taylor JI, Grace PB, et al. Polymorphisms in the CYP19 gene may affect the positive correlations between serum and urine phytoestrogen metabolites and plasma androgen concentrations in men. *J Nutr*. 2005 Nov;135(11):2680-6.
33. Heald CL, Ritchie MR, Bolton-Smith C, et al. Phyto-estrogens and risk of prostate cancer in Scottish men. *Br J Nutr*. 2007 Aug;98(2):388-96.
34. McCann SE, Ambrosone CB, Moysich KB, et al. Intakes of selected nutrients, foods, and phytochemicals and prostate cancer risk in western New York. *Nutr Cancer*. 2005;53(1):33-41.
35. Chen LH, Fang J, Li H, et al. Enterolactone induces apoptosis in human prostate carcinoma LNCaP cells via a mitochondrial-mediated, caspase-dependent pathway. *Mol Cancer Ther*. 2007 Sep;6(9):2581-90.
36. Konkol Y, Vuorikoski H, Tuomela J, et al. Galactoglucomannan-rich hemicellulose extract from Norway spruce (*Picea abies*) exerts beneficial effects on chronic prostatic inflammation and lower urinary tract symptoms in vivo. *Int J Biol Macromol*. 2017 Aug;101:222-9.
37. Lamblin F, Hano C, Fliniaux O, et al. [Interest of lignans in prevention and treatment of cancers]. *Med Sci (Paris)*. 2008 May;24(5):511-9.
38. Brooks JD, Thompson LU. Mammalian lignans and genistein decrease the activities of aromatase and 17beta-hydroxysteroid dehydrogenase in MCF-7 cells. *J Steroid Biochem Mol Biol*. 2005 Apr;94(5):461-7.
39. Yassin A, AlRumaihi K, Alzubaidi R, et al. Testosterone, testosterone therapy and prostate cancer. *Aging Male*. 2019 Dec;22(4):219-27.
40. Pizzorno L. Nothing Boring About Boron. *Integr Med (Encinitas)*. 2015 Aug;14(4):35-48.
41. Li N, Wu X, Zhuang W, et al. Tomato and lycopene and multiple health outcomes: Umbrella review. *Food Chem*. 2021 May 1;343:128396.
42. Chen P, Zhang W, Wang X, et al. Lycopene and Risk of Prostate Cancer: A Systematic Review and Meta-Analysis. *Medicine (Baltimore)*. 2015 Aug;94(33):e1260.
43. Mirahmadi M, Azimi-Hashemi S, Saburi E, et al. Potential inhibitory effect of lycopene on prostate cancer. *Biomed Pharmacother*. 2020 Sep;129:110459.
44. Zu K, Mucci L, Rosner BA, et al. Dietary Lycopene, Angiogenesis, and Prostate Cancer: A Prospective Study in the Prostate-Specific Antigen Era. *JNCI: Journal of the National Cancer Institute*. 2014;106(2).

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REVIEW

# Whole-Body Support

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<b>NT2 Collagen™</b> standardized cartilage	<b>40 mg</b>
Total Collagen	<b>10 mg</b>
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<sup>Δ</sup> 3-O-acetyl-11-keto-B-boswellic acid.

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**Rick**

VERIFIED CUSTOMER REVIEW

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A man and a woman are in a forest, looking at a mushroom. The man is holding a basket of mushrooms. The woman is holding a mushroom. The man is wearing a green vest and a blue sweater. The woman is wearing a grey sweater and a grey scarf. The background is a forest with trees.

# HOW MUSHROOMS PROTECT AGAINST AGING



BY GREGORY E. BIGFORD, PHD, MSBA

Human studies have found an association between **mushroom** consumption and lower risk of **chronic diseases** and **premature death**.

One study of more than **15,000 Americans** found that those who consumed **mushrooms** had a **16% lower risk of mortality** than those who did not eat mushrooms.

Replacing just one serving a day of red or processed meat with **mushrooms** was associated with a **35% lower** risk of all-cause mortality.<sup>1</sup>

Research has identified an amino acid in mushrooms, **L-ergothioneine**, that may be responsible for these health-promoting effects.<sup>2</sup>

One of the world's preeminent nutritional biochemists, **Dr. Bruce Ames**, published a seminal review proposing that **L-ergothioneine** should be classified as a "**longevity vitamin**."<sup>2</sup>

L-ergothioneine is not produced in the body. It must be obtained through diet.<sup>2-5</sup>

Typical American diets are *low* in mushrooms. **L-ergothioneine** levels in the body also tend to decline with age.<sup>6</sup>

For those who don't ingest lots of mushrooms, direct oral intake of **L-ergothioneine** is an easy way to obtain their benefits.



### What is L-Ergothioneine?

**L-ergothioneine** is an amino acid found in high concentrations in mushrooms and other fungi.<sup>7</sup> High levels are found in edible mushrooms such as **porcini, oyster, shiitake, and maitake.**<sup>8</sup>

The amount of L-ergothioneine in mushrooms varies with the species and is impacted by conventional agricultural practices. It would take about **2-5 cups** of common white button mushrooms to get **5 mg** of dietary L-ergothioneine.<sup>8,9</sup> That's why supplements are a better choice to maintain daily intake.

A growing body of evidence has found that mushrooms may help prevent chronic diseases and premature death.<sup>1</sup>

A major scientific discovery in 2005, found that humans produce a **transporter protein** responsible for taking up **L-ergothioneine** from the diet and delivering it to cells throughout the body.<sup>10</sup>

Due to the widespread tissue distribution of this transporter, it can transport L-ergothioneine **100 times** more efficiently than other compounds.<sup>10-12</sup>

Clinical studies suggest most tissues of the body contain L-ergothioneine.<sup>3,4,10,13</sup> This finding helped drive the scientific investigation into how this amino acid works in the body, and the suggestion that it be classified as a **longevity vitamin.**<sup>2</sup>

### Reduced Telomere Shortening

Several studies have pointed out how **L-ergothioneine** may promote **longevity.**

One contributor to the **aging** process is the loss, or **shortening, of telomeres,** the protective caps on the ends of chromosomes.<sup>14</sup> Telomere *shortening* is a marker of advanced cellular aging, loss of function, and eventual cell death.

A **2022** study found that L-ergothioneine significantly reduced the **rate of telomere shortening and the number** of short telomeres in cells exposed to oxidative stress.<sup>15</sup>

Another area being studied is L-ergothioneine's ability to **protect cellular DNA.**

For example, ultraviolet-induced **DNA damage** in the skin accelerates skin aging and risk of skin cancer.<sup>16</sup> L-ergothioneine protects *against* this DNA damage in the skin,<sup>17-20</sup> which is one reason it is an ingredient in many anti-aging creams.<sup>21</sup>

**Oxidative stress** is a driver of disease and accelerated aging. L-ergothioneine is closely related to **glutathione,** one of the most powerful **antioxidants** produced in the body.<sup>8,22-24</sup> L-ergothioneine concentrates in the **mitochondria,**<sup>3</sup> which are vulnerable to oxidative damage.





## WHAT YOU NEED TO KNOW

Preclinical evidence shows that **L-ergothioneine** can help neutralize damaging oxidizing compounds *before* they damage mitochondria.<sup>25,26</sup> It can also protect against free radicals that damage DNA and proteins.<sup>18,19,27</sup>

Experimental evidence has also shown that L-ergothioneine can *inhibit* the synthesis of **pro-inflammatory cytokines**, which are abundant in many chronic inflammatory diseases associated with aging.<sup>28-30</sup>

Together, these effects may help ward off chronic disease and promote **longer life**.

### Protecting the Brain

The concentration of L-ergothioneine is particularly high in several major regions of the **brain**, including those responsible for cognitive function, learning, and memory.<sup>31,32</sup>

In mice, L-ergothioneine promotes nerve cell maturation, resulting in **enhanced memory**.<sup>33</sup> Cell studies show it helps promote the formation of **new neurons**,<sup>32,34,35</sup> which is vital to learning and also to memory formation.<sup>36</sup>

In animal models, it is protective against oxidative-stress-induced *deficits* in learning and memory<sup>37</sup> and learning deficits induced by **beta-amyloid** accumulation.<sup>38</sup> Beta-amyloid buildup is seen in the brains of patients with **Alzheimer's disease**, making L-ergothioneine an intriguing candidate for clinical studies looking at neuroprotective agents.

## L-Ergothioneine's Health Benefits

- In an observational study, people who consumed **mushrooms** had a **16% lower risk of dying** than those who didn't. The amino acid **L-ergothioneine** is believed to be largely responsible for mushrooms' health benefits.
- L-ergothioneine may promote **longevity** by preventing shortening of telomeres, protecting DNA from damage, fighting oxidative stress and inflammation, and protecting the brain and heart.
- In a population study, *higher* levels of L-ergothioneine in the body were associated with *reduced* risk of **cardio-metabolic disease** and **cardiovascular mortality**.
- In a clinical trial of adults with mild cognitive impairment, taking **5 mg** of L-ergothioneine daily for 12 weeks significantly improved measures of **cognitive function**.

In humans, *lower* blood levels of L-ergothioneine have been noted in patients with both **mild cognitive impairment** and **dementia**, compared to healthy subjects, suggesting that low L-ergothioneine could be a risk factor for these conditions.<sup>39-41</sup> Low levels of L-ergothioneine are also seen in patients with **Parkinson's disease**<sup>42</sup> and **brain matter atrophy**.<sup>43</sup>

In a clinical trial of adults with **mild cognitive impairment**, taking a mushroom extract containing **5 mg** of L-ergothioneine daily for 12 weeks led to significant *improvements* in verbal memory, working memory, sustained attention, and other measures of **cognitive function** compared to those taking a placebo.<sup>44</sup>

## Cardiovascular Health

Diseases of the **heart** and **blood vessels** remain the leading causes of death and disability.<sup>45</sup>

Dysfunction of the **vascular endothelium** is central to a wide range of cardiovascular disorders, including hypertension, atherosclerosis, chronic heart failure, coronary artery disease, and diabetes.<sup>46</sup>

**L-ergothioneine** has been found to be protective against different types of oxidative and inflammatory damage in **endothelial cells**,<sup>47,48</sup> which form the inner lining of blood vessels.

It also protects against cell stressors that impair vascular relaxation,<sup>49</sup> and prevents the binding of **monocytes** (a type of white blood cell) to endothelial cells, an early event in **cardiovascular disease**.<sup>4,50</sup>

A large population study published in **2020** showed that *higher* levels of **L-ergothioneine** in the body are associated with *reduction* of **cardiometabolic diseases** by **15%**, **cardiovascular mortality** by **21%**, and overall mortality by **14%**.<sup>51</sup>

Other studies revealed that **L-ergothioneine** protects the endothelium from cell death.<sup>48</sup>

## Summary

**L-ergothioneine** is an amino acid found predominantly in mushrooms.

Its potent **antioxidant** and **anti-inflammatory** effects may help slow the cellular aging process and protect the body against age-related disorders, including neurodegenerative and cardiovascular diseases.

This may explain why, in population studies, people who eat **mushrooms** have a *reduced* risk of **mortality**. •

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. Ba DM, Gao X, Muscat J, et al. Association of mushroom consumption with all-cause and cause-specific mortality among American adults: prospective cohort study findings from NHANES III. *Nutr J*. 2021 Apr 22;20(1):38.
2. Ames BN. Prolonging healthy aging: Longevity vitamins and proteins. *Proc Natl Acad Sci U S A*. 2018 Oct 23;115(43):10836-44.
3. Cheah IK, Halliwell B. Ergothioneine, recent developments. *Redox Biol*. 2021 Jun;42:101868.
4. Paul BD. Ergothioneine: A Stress Vitamin with Antiaging, Vascular, and Neuroprotective Roles? *Antioxid Redox Signal*. 2022 Jun;36(16-18):1306-17.
5. Cheung B, Kwan M, Chan R, et al. Potential of Asian Natural Products for Health in Aging. In: Malavolta M, Mocchegiani E, editors. *Molecular Basis of Nutrition and Aging*. San Diego: Academic Press; 2016:659-76.
6. Beelman RB, Kalaras MD, Phillips AT, et al. Is ergothioneine a 'longevity vitamin' limited in the American diet? *J Nutr Sci*. 2020;9:e52.
7. Jones GW, Doyle S, Fitzpatrick DA. The evolutionary history of the genes involved in the biosynthesis of the antioxidant ergothioneine. *Gene*. 2014 Oct 1;549(1):161-70.
8. Kalaras MD, Richie JP, Calcagnotto A, et al. Mushrooms: A rich source of the antioxidants ergothioneine and glutathione. *Food Chem*. 2017 Oct 15;233:429-33.
9. Halliwell B, Cheah IK, Tang RMY. Ergothioneine - a diet-derived antioxidant with therapeutic potential. *FEBS Lett*. 2018 Oct;592(20):3357-66.



10. Gründemann D, Harlfinger S, Golz S, et al. Discovery of the ergothioneine transporter. *Proc Natl Acad Sci U S A*. 2005 Apr 5;102(14):5256-61.
11. Grigat S, Harlfinger S, Pal S, et al. Probing the substrate specificity of the ergothioneine transporter with methimazole, mercynine, and organic cations. *Biochem Pharmacol*. 2007 Jul 15;74(2):309-16.
12. Tucker RAJ, Cheah IK, Halliwell B. Specificity of the ergothioneine transporter natively expressed in HeLa cells. *Biochem Biophys Res Commun*. 2019 May 21;513(1):22-7.
13. Cheah IK, Tang RM, Yew TS, et al. Administration of Pure Ergothioneine to Healthy Human Subjects: Uptake, Metabolism, and Effects on Biomarkers of Oxidative Damage and Inflammation. *Antioxid Redox Signal*. 2017 Feb 10;26(5):193-206.
14. Donate LE, Blasco MA. Telomeres in cancer and ageing. *Philos Trans R Soc Lond B Biol Sci*. 2011 Jan 12;366(1561):76-84.
15. Samuel P, Tsapekos M, de Pedro N, et al. Ergothioneine Mitigates Telomere Shortening under Oxidative Stress Conditions. *J Diet Suppl*. 2022;19(2):212-25.
16. D'Orazio J, Jarrett S, Amaro-Ortiz A, et al. UV radiation and the skin. *Int J Mol Sci*. 2013 Jun 7;14(6):12222-48.
17. Bazela K, Solyga-Zurek A, Debowska R, et al. L-Ergothioneine Protects Skin Cells against UV-Induced Damage—A Preliminary Study. *Cosmetics*. 2014;1(1):51-60.
18. Hseu YC, Lo HW, Korivi M, et al. Dermato-protective properties of ergothioneine through induction of Nrf2/ARE-mediated antioxidant genes in UVA-irradiated Human keratinocytes. *Free Radic Biol Med*. 2015 Sep;86:102-17.
19. Obayashi K, Kurihara K, Okano Y, et al. L-Ergothioneine scavenges superoxide and singlet oxygen and suppresses TNF-alpha and MMP-1 expression in UV-irradiated human dermal fibroblasts. *J Cosmet Sci*. 2005 Jan-Feb;56(1):17-27.
20. Rai RK, Chalana A, Karri R, et al. Role of Hydrogen Bonding by Thioures in Protecting Biomolecules from Copper(I)-Mediated Oxidative Damage. *Inorg Chem*. 2019 May 20;58(10):6628-38.
21. Cronin H, Draeos ZD. Top 10 botanical ingredients in 2010 anti-aging creams. *J Cosmet Dermatol*. 2010 Sep;9(3):218-25.
22. Wu G, Fang YZ, Yang S, et al. Glutathione metabolism and its implications for health. *J Nutr*. 2004 Mar;134(3):489-92.
23. Dong KK, Damaghi N, Kibitel J, et al. A comparison of the relative antioxidant potency of L-ergothioneine and idebenone. *J Cosmet Dermatol*. 2007 Sep;6(3):183-8.
24. Franzoni F, Colognato R, Galetta F, et al. An in vitro study on the free radical scavenging capacity of ergothioneine: comparison with reduced glutathione, uric acid and trolox. *Biomed Pharmacother*. 2006 Sep;60(8):453-7.
25. Kerley RN, McCarthy C, Kell DB, et al. The potential therapeutic effects of ergothioneine in pre-eclampsia. *Free Radic Biol Med*. 2018 Mar;117:145-57.
26. Paul BD, Snyder SH. The unusual amino acid L-ergothioneine is a physiologic cytoprotectant. *Cell Death Differ*. 2010 Jul;17(7):1134-40.
27. Markova NG, Karaman-Jurukovska N, Dong KK, et al. Skin cells and tissue are capable of using L-ergothioneine as an integral component of their antioxidant defense system. *Free Radic Biol Med*. 2009 Apr 15;46(8):1168-76.
28. Borodina I, Kenny LC, McCarthy CM, et al. The biology of ergothioneine, an antioxidant nutraceutical. *Nutr Res Rev*. 2020 Dec;33(2):190-217.
29. Laurenza I, Colognato R, Migliore L, et al. Modulation of palmitic acid-induced cell death by ergothioneine: evidence of an anti-inflammatory action. *Biofactors*. 2008;33(4):237-47.
30. Rahman I, Gilmour PS, Jimenez LA, et al. Ergothioneine inhibits oxidative stress- and TNF-alpha-induced NF-kappa B activation and interleukin-8 release in alveolar epithelial cells. *Biochem Biophys Res Commun*. 2003 Mar 21;302(4):860-4.
31. Ishimoto T, Kato Y. Ergothioneine in the brain. *FEBS Lett*. 2022 May;596(10):1290-8.
32. Nakamichi N, Taguchi T, Hosotani H, et al. Functional expression of carnitine/organic cation transporter OCTN1 in mouse brain neurons: possible involvement in neuronal differentiation. *Neurochem Int*. 2012 Dec;61(7):1121-32.
33. Nakamichi N, Nakao S, Nishiyama M, et al. Oral Administration of the Food-Derived Hydrophilic Antioxidant Ergothioneine Enhances Object Recognition Memory in Mice. *Curr Mol Pharmacol*. 2021;14(2):220-33.
34. Ishimoto T, Masuo Y, Kato Y, et al. Ergothioneine-induced neuronal differentiation is mediated through activation of S6K1 and neurotrophin 4/5-TrkB signaling in murine neural stem cells. *Cell Signal*. 2019 Jan;53:269-80.
35. Ishimoto T, Nakamichi N, Hosotani H, et al. Organic cation transporter-mediated ergothioneine uptake in mouse neural progenitor cells suppresses proliferation and promotes differentiation into neurons. *PLoS One*. 2014;9(2):e89434.
36. Toda T, Parylak SL, Linker SB, et al. The role of adult hippocampal neurogenesis in brain health and disease. *Mol Psychiatry*. 2019 Jan;24(1):67-87.
37. Song TY, Lin HC, Chen CL, et al. Ergothioneine and melatonin attenuate oxidative stress and protect against learning and memory deficits in C57BL/6J mice treated with D-galactose. *Free Radic Res*. 2014 Sep;48(9):1049-60.
38. Yang NC, Lin HC, Wu JH, et al. Ergothioneine protects against neuronal injury induced by beta-amyloid in mice. *Food Chem Toxicol*. 2012 Nov;50(11):3902-11.
39. Cheah IK, Feng L, Tang RMY, et al. Ergothioneine levels in an elderly population decrease with age and incidence of cognitive decline; a risk factor for neurodegeneration? *Biochem Biophys Res Commun*. 2016 Sep 9;478(1):162-7.
40. Kameda M, Teruya T, Yanagida M, et al. Frailty markers comprise blood metabolites involved in antioxidation, cognition, and mobility. *Proc Natl Acad Sci U S A*. 2020 Apr 28;117(17):9483-9.
41. Teruya T, Chen YJ, Kondoh H, et al. Whole-blood metabolomics of dementia patients reveal classes of disease-linked metabolites. *Proc Natl Acad Sci U S A*. 2021 Sep 14;118(37).
42. Hatano T, Saiki S, Okuzumi A, et al. Identification of novel biomarkers for Parkinson's disease by metabolomic technologies. *J Neurol Neurosurg Psychiatry*. 2016 Mar;87(3):295-301.
43. Wu LY, Cheah IK, Chong JR, et al. Low plasma ergothioneine levels are associated with neurodegeneration and cerebrovascular disease in dementia. *Free Radic Biol Med*. 2021 Dec;177:201-11.
44. Watanabe N MS, Suzuki M, Fukaya T, Kato Y, Hashiya N. Effect of ergothioneine on the cognitive function improvement in healthy volunteers and mild cognitive impairment subjects—A randomized, double-blind, parallel-group comparison study. *Jpn Pharmacol Ther*. 2020;48:685-97.
45. Available at: <https://www.cdc.gov/heartdisease/facts.htm>. Accessed October 17, 2022.
46. Zhazykbayeva S, Pabel S, Mügge A, et al. The molecular mechanisms associated with the physiological responses to inflammation and oxidative stress in cardiovascular diseases. *Biophys Rev*. 2020 Aug;12(4):947-68.
47. Li RW, Yang C, Sit AS, et al. Uptake and protective effects of ergothioneine in human endothelial cells. *J Pharmacol Exp Ther*. 2014 Sep;350(3):691-700.
48. Servillo L, D'Onofrio N, Casale R, et al. Ergothioneine products derived by superoxide oxidation in endothelial cells exposed to high-glucose. *Free Radic Biol Med*. 2017 Jul;108:8-18.
49. Gokce G, Arun MZ. Ergothioneine produces relaxation in isolated rat aorta by inactivating superoxide anion. *Eur Rev Med Pharmacol Sci*. 2014;18(21):3339-45.
50. Martin KR. The bioactive agent ergothioneine, a key component of dietary mushrooms, inhibits monocyte binding to endothelial cells characteristic of early cardiovascular disease. *J Med Food*. 2010 Dec;13(6):1340-6.
51. Smith E, Ottosson F, Hellstrand S, et al. Ergothioneine is associated with reduced mortality and decreased risk of cardiovascular disease. *Heart*. 2020 May;106(9):691-7.

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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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# Essential Youth with L-Ergothioneine

The 'Longevity'  
Amino Acid



**L-ergothioneine** is an amino acid found in **mushrooms**.

Cell-based studies suggest that **L-ergothioneine** may support healthy longevity by:

- Protecting against **mitochondrial DNA** damage<sup>1</sup>
- Delaying **telomere** shortening<sup>2</sup>
- Supporting **DNA function** in cells subjected to UV exposure<sup>3</sup>

One daily capsule of **Essential Youth** provides **5 mg** of **L-ergothioneine**.

This **5 mg** potency exceeds the **L-ergothioneine** contained in 2 cups of white button mushrooms, depending on growing conditions.<sup>4,5</sup>

#### References

1. *Cell Death Differ.* 2010 Jul;17(7):1134-40.
2. *J Diet Suppl.* 2020 Dec 7:1-14.
3. *Free Radic Biol Med.* 2009 Apr 15;46(8):1168-76.
4. *FEBS Lett.* 2018 Oct;592(20):3357-66.
5. *Food Chem.* 2017 Oct 15;233:429-33.

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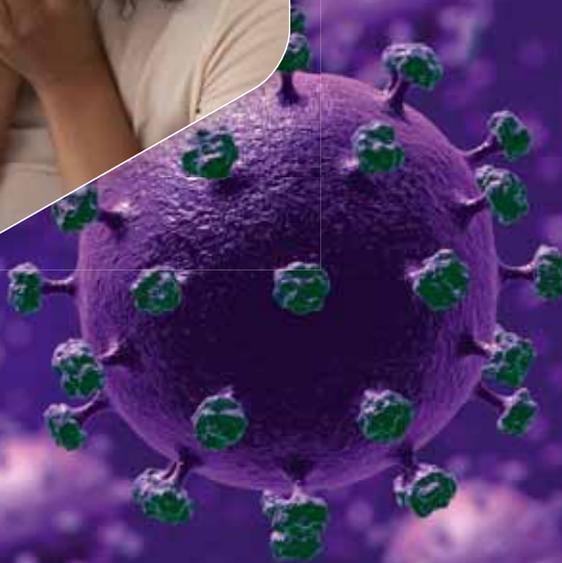
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# Vitamin D and Immunity

BY LAURIE MATHENA



Vitamin D plays a critical role in supporting the **immune system**.<sup>1-4</sup>

Low vitamin D levels have been associated with an increased risk of communicable diseases, including **viral** and **bacterial infections**.<sup>1</sup>

Approximately **40%** of Americans have *insufficient* blood levels of vitamin D, and close to **30%** have *deficient* vitamin D. This represents a major health risk, especially for older individuals.<sup>5</sup>

Vitamin D **supplementation** has been shown to help protect against acute respiratory infections.<sup>1</sup>

The following studies, published in the past few years, have added support to vitamin D's role in boosting immunity and protecting against various infections:

- **Vitamin D deficiency increases risk of respiratory tract infections.**<sup>2</sup> In elderly, institutionalized individuals, vitamin D deficiency was associated with an increased incidence of respiratory tract infections. The researchers suggested supplementation with vitamin D as a method for preventing respiratory tract infections.

- Low vitamin D status is associated with increased risk of chronic rhinosinusitis.**<sup>6</sup> Researchers found a significant association between lower serum vitamin D status and having chronic rhinosinusitis, which is persistent inflammation of the upper respiratory tract caused by immune dysfunction.
- Vitamin D supplementation reduces the risk of acute respiratory tract infections.**<sup>3</sup> After reviewing evidence from randomized, controlled trials, researchers found that vitamin D supplementation is modestly effective at reducing the risk of acute respiratory tract infections, as well as shortening the duration of their symptoms.

**Life Extension** recommends maintaining vitamin D blood levels (*25-hydroxyvitamin D*) between **50-80 ng/mL** with yearly blood testing to ensure optimal status. •

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. Martineau AR, Jolliffe DA, Hooper RL, et al. Vitamin D supplementation to prevent acute respiratory tract infections: systematic review and meta-analysis of individual participant data. *BMJ*. 2017 Feb 15;356:i6583.
2. Kuwabara A, Tsugawa N, Ao M, et al. Vitamin D deficiency as the risk of respiratory tract infections in the institutionalized elderly: A prospective 1-year cohort study. *Clin Nutr ESPEN*. 2020 Dec;40:309-13.
3. Abioye AI, Bromage S, Fawzi W. Effect of micronutrient supplements on influenza and other respiratory tract infections among adults: a systematic review and meta-analysis. *BMJ Glob Health*. 2021 Jan;6(1).
4. Zdrengeha MT, Makrinioti H, Bagacean C, et al. Vitamin D modulation of innate immune responses to respiratory viral infections. *Rev Med Virol*. 2017 Jan;27(1).
5. Liu X, Baylin A, Levy PD. Vitamin D deficiency and insufficiency among US adults: prevalence, predictors and clinical implications. *Br J Nutr*. 2018 Apr;119(8):928-36.
6. Li B, Wang M, Zhou L, et al. Association between serum vitamin D and chronic rhinosinusitis: a meta-analysis. *Braz J Otorhinolaryngol*. 2021 Mar-Apr;87(2):178-87.



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Item #02234 • 3 mg per 20 drops, 2 fl. oz

1 bottle \$9 • 4 bottles \$8.25 each

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## VITAMIN D3

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

"This is a necessary ingredient for my health."

**James**

VERIFIED CUSTOMER  
REVIEW

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

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



**Item #01713**

125 mcg (5000 IU) • 60 softgels

1 bottle **\$7.50** • 4 bottles \$6.50 each



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



# AGE-REVERSAL UPDATE

## Highlights from 2021-2022

By William Faloon  
Slides Designed By Chase Falcon

In October 2022, I gave the keynote talk to open a 4-day event where physicians and scientists presented findings on combatting **biological aging**.

My presentation was limited to 55-minutes.

I could have taken the entire day based on the abundance of new data to report.

I opened my talk by stating that there had been more advances in the fields of **age-delay** and **age-reversal** over the prior 12 months than in *any* one-year period in human history.

This article summarizes highlights of my presentation at the **Revolution Against Aging and Death (RAADfest)** conference held in San Diego on October 6-9, 2022.

**Advancing Towards Immortality**

1. Research findings since last year's RAADfest.
2. What is an "optimized diet?"
3. New life extension drugs.
4. Key to super longevity!
5. Clinical trials targeting systemic regeneration.
6. "Live Forever" via transhumanism.

**RAAD FESTIVAL 2022**

AGE REVERSAL RESEARCH UPDATE | Optimize Your Diet | New Anti Aging Drugs | Regeneration Targeted Clinical Trials | Key to Super Longevity

### Mainstream Media Coverage

The science of age reversal continues to garner favorable media coverage.

I presented a few of the many news outlets' reports on **regenerative medicine** advances including:

**CBS News:** Can we reset our biological clocks?

**New Scientist:** How to GROW YOUNGER

**New York Times:** Can a Magic Protein Slow the Aging Process?

**Can we reset our biological clocks?**

As Reported on CBS NEWS | November 28, 2021

Three of the leading scientists on aging all agree that either slowing our clock, or perhaps even resetting it, is no longer science fiction:

- "Aging can be **delayed**"
- "Aging can be **stopped**"
- "Aging can be **reversed**"

<https://www.cbsnews.com/news/can-we-reset-our-biological-clocks/>

**"Growing Younger: Radical Insights Into Aging Could Help Us Reverse It"**

April 30, 2022

- Once-faltering paws gripped objects with **renewed strength**.
- **Hearts** and **livers** of rats regained youthful vitality.
- Fuzzy **memories** sharpened.
- **Biological age** had been **cut in half**.

"It was as if someone had turned back time."

April 30, 2022 | <https://www.newscientist.com/issue/3384/>

Front Cover of New Scientist: **"HOW TO GROW YOUNGER"**

-April 30th, 2022-

As featured in July 19, 2022

**The New York Times**

**"Can a 'Magic' Protein Slow the Aging Process?"**

Elevian is one of several companies searching for ways to increase life span — in this case, using a protein called GDF11. But challenges lie ahead."

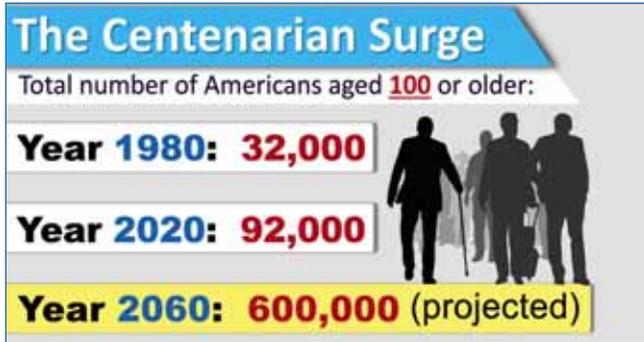
## A Biological Renaissance

We are in the midst of a **biomedical renaissance** whereby human life spans are markedly improving.

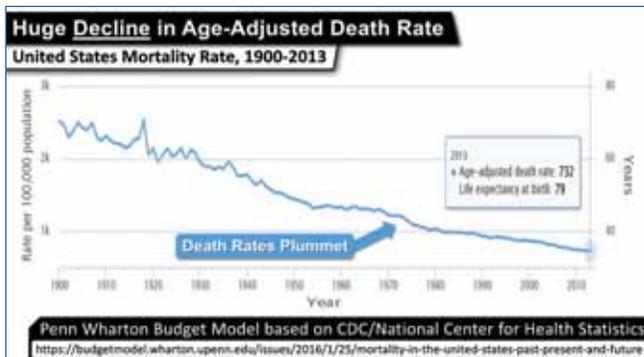
As with the **European Renaissance**, few people today understand the magnitude of the scientific gains.

Nearly **3 times more** Americans were alive **aged 100** and older in **2020** compared to **1980**.

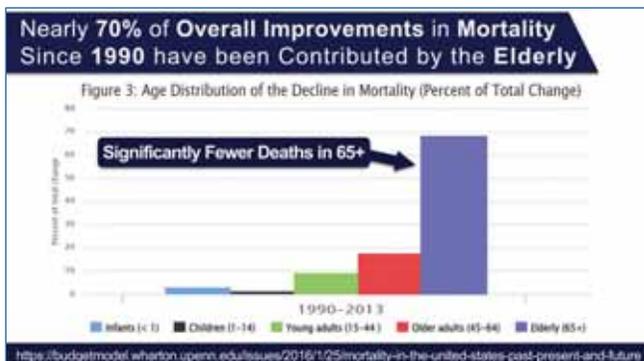
The number of American centenarians is expected to surge **7-fold higher** by **2060**.



The **age-adjusted** death rate has plummeted. This means the increase in **centenarians** is not only due to more people, but that **older people** are **living longer**.



And since year **1990**, nearly **70%** of mortality reductions have occurred in Americans **over age 65**. This reflects significant longevity gains in older segments of the American population. (Which includes a lot of our readers including me!)



## Where you Live Determines How Long You May Live

I displayed a map showing a nearly **9-year disparity** in life expectancy between **Mississippi** and **Hawaii**.

I pointed out that people living in states where **healthier lifestyles** are practiced enjoy *longer* disease-free lifespans.

**As reported in ABC News**  
**The Highest Life Expectancy...80.7 Years in Hawaii**  
Aug 23, 2022 Mississippi had the lowest life expectancy at 71.9 years.

Higher life expectancy in California, Utah, Minnesota & Massachusetts.

Hawaii: 80.7 Years

Bottom states include West Virginia, Louisiana, Alabama, Oklahoma, and Kentucky.

Mississippi: 71.9 Years

<https://abcnews.go.com/Health/life-expectancy-dropped-2020-us-state-due-covid/story?id=88698742>

Much of this longevity disparity is attributable to dietary differences. I listed toxic foods to avoid on the next slide.

**TOXIC Foods to Reduce or Avoid**

✓ Red meat	✓ Soda, desserts, candy
✓ Overcooked meats	✓ Most processed foods
✓ Butter	✓ Sugars
✓ Processed red meat (hot dogs, bacon)	✓ Refined grains (white bread/white grain pasta)
✓ Cured ham (nitrite preserved meats)	✓ Excess salt
	✓ Most frozen meals

<https://www.foodnetwork.com/healthy/articles/what-foods-are-not-allowed-on-mediterranean-diet>

I present this list of **toxic foods** during many of my talks to reinforce healthier dietary practices.

## Billionaires and Government Fund Age-Reversal Research

In **January 2022**, the *largest* **age-reversal** project in history was announced, with **\$3 billion** committed by billionaires (like Jeff Bezos and Peter Thiel) and the **National Institutes of Aging**.

This is a venture between the **federal government** and the **ultra-wealthy** seeking methods to delay and reverse aging!

**As reported in The Economist** **A \$3 Billion Bet on Finding the Fountain of Youth**  
 January 22, 2022

"they believe they have glimpsed the outline of an answer to the question of how to **reverse** the process of cellular aging. They have also recruited a **star-studded scientific cast** to help them track that answer down."

This list includes **4 Nobel prize winners**, including the discoverer of **Yamanaka factors**, **Dr. Yamanaka** himself.



[Economist.com/science-and-technology/a-3bn-bet-on-finding-the-fountain-of-youth/21807244](https://www.economist.com/science-and-technology/a-3bn-bet-on-finding-the-fountain-of-youth/21807244)

Five months later (June 2022), **MIT** announced the Saudi Royal Family has started a nonprofit group that plans to spend up to **\$1 billion a year** to do **“research on the biology of aging and find ways to extend the number of years people live in good health.”**

**As reported in MIT Technology Review** **Saudi Arabia Plans To Spend \$1 Billion A Year Discovering Treatments To Slow Aging**  
 The oil kingdom fears that its population is aging at an accelerated rate and hopes to test drugs to **reverse** the problem. First up might be the diabetes drug metformin.

**“ THE SAUDI ROYAL FAMILY has started a not-for-profit organization called the Revolution Foundation that plans to spend up to **\$1 BILLION A YEAR** of its oil wealth supporting basic research on the biology of aging and finding ways to extend the number of years people live in good health ”**

<https://www.technologyreview.com/2022/06/07/1053132/saudi-arabia-slow-aging-metformin/> June 7, 2022

### Human Genome 100% Sequenced

In **2003**, scientists sequenced **92%** of the **human genome**. This caused the lay public to think the entire human genome had been sequenced.

In **March 2022**, scientists announced that **100%** of the **human genome** had been sequenced.

That means the gene editing therapies being studied now (such as **CRISPR**) may be used to combat virtually every disease, including **aging** itself.

**As reported by CNN** **Scientists sequence the complete human genome for the first time**  
 Mar. 31, 2022

- The **Human Genome Project** sequenced **92%** of the human genome (2003)
- Scientists struggled to decipher the remaining **8%**
- ~100 scientist team unravels **complete** human genome (2022)
- **First** time **human genome** has been sequenced in its entirety
- Fresh insights into cancer, birth defects and aging



<https://www.cnn.com/2022/03/31/health/first-complete-human-genome-sequence>

### Human Trial using CRISPR Gene Therapy

A **monkey** trial published in **May 2021** showed a single **CRISPR** gene therapy injection lowered cholesterol by **60%** and kept it low. This same research transitioned into a **human** trial that initiated studies in **July 2022**—only a **14-month** gap between primate and human research!

Historically, it has taken much *longer* to transition successful animal research into clinical trials.

**Rapid Transition from Animal Findings to Clinical Trials**  
**“CRISPR cure for High Cholesterol enters first Human Trial”**

**May 2021** - One-time CRISPR shot lowers LDL cholesterol by **60%** in **monkeys**. The base edit knocks out the **PCSK9** gene, to enable more LDL to be removed.

**July 2022** - **Human** trial launches using nanoparticles to deliver **CRISPR** genetic instructions to cells to knock out **PCSK9** in people with familial hypercholesterolemia.



Nature 2021, DOI: 10.1038/s41586-021-03034-y https://pubmed.ncbi.nlm.nih.gov/35040000/

CRISPR technology has even advanced to the point of engineering stronger **immune T-cells** to kill more tumor cells as reported in **August 2022**. This might help enable aging humans to escape the lethal impact of **immune senescence**.

**One Gene Edit Kills More Tumor Cells**



**CRISPR Engineers Stronger T Cells For Immunotherapy**

Aug 25, 2022 <https://www.genengnews.com/t-cells/crispr-engineers-stronger-t-cells-for-immunotherapy>

### Age Reversal in Live Mice

As researcher’s zero in on rejuvenation strategies, a promising near-term solution is to use **“transcription factors”** to turn “on” pro-youth **genes** and turn “off” senescent-inducing genes.

*Transcription factors* **reprogram** the **genes** of old cells, so the old cells can transform into **young** cells.

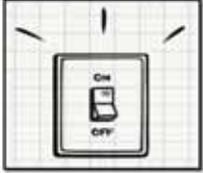
The two slides on the next page help further explain “transcription factors”.

**Transcription factors** are proteins that help turn specific **genes** "on" or "off" by binding to DNA.

Transcription factors that are **activators** boost a gene's transcription.

Transcription factors that are **repressors** decrease transcription.

Groups of transcription factors can turn a **gene on/off** in specific parts of the body.



**Transcription factors** can enable old cells to be **reprogrammed** into **embryonic cells** capable of developing into **all tissues** of the body.

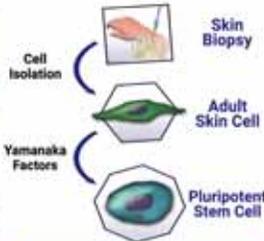
**The Nobel Prize in Physiology or Medicine 2012**

"For the discovery that mature cells can be reprogrammed to become pluripotent."

Four specific genes encode **transcription factors** that can convert somatic cells into pluripotent stem cells that can propagate indefinitely.

These transcription factors are called:

**"Yamanaka Factors"**



[nobelprize.org/prizes/medicine/2012/yamanaka](https://www.nobelprize.org/prizes/medicine/2012/yamanaka)

On **March 7, 2022**, the world awoke to an unprecedented announcement from the **SALK Institute**. Salk scientists had safely and effectively **reversed** the **aging process** in live mice by using **transcription factors**.

This generated headline news stories worldwide including Jimmy Fallon of **The Tonight Show** reporting that scientists had succeeded in "**reversing the aging process by making cells young again.**"

The following three slides provide highlights to describe how Yamanaka **transcription factors** were used to **reverse** aging in live mice.

**The Salk Institute Reports: March 7, 2022**

"Cellular rejuvenation therapy safely reverses signs of aging in mice"

**Partial Cell Reprogramming – Safe**

- Partial **cell reprogramming** in live (in vivo) mice
- OSKM ("Yamanaka") **transcription factors** used
- Longer administration yielded unique benefits
- **No toxicity** or increase in cancer detected



<https://www.nature.com/articles/s43587-022-00183-2>

<https://www.salk.edu/news-release/cellular-rejuvenation-therapy-safely-reverses-signs-of-aging-in-mice/>

**Findings Reported in Nature: March 7, 2022**

"Cellular rejuvenation therapy safely reverses signs of aging in mice"

**Cell Rejuvenation in Live Mice**

- Long-term cell reprogramming results in "**younger**" skin.
- Skin cells divide more rapidly.
- **Lower inflammation** and **reduced senescent-associated secretory phenotypes** in treated animals.
- No data collected on lifespan, exercise, memory, or muscle.



<https://www.nature.com/articles/s43587-022-00183-2>

<https://www.salk.edu/news-release/cellular-rejuvenation-therapy-safely-reverses-signs-of-aging-in-mice/>

**Major Findings:**

"they found that the mice, in many ways, **resembled younger animals.**"

"In both the kidneys and skin, the **epigenetics** of treated animals more closely resembled **epigenetic patterns** seen in **younger animals.**"



**The Treatment Made The Mice's Cells Look Younger**

<https://www.salk.edu/news-release/cellular-rejuvenation-therapy-safely-reverses-signs-of-aging-in-mice/>

**Rewriting the Rules of Biology**

Time-honored doctrine is that **cell aging** is **irreversible** and that old cells eventually degenerate and die.

In **2006**, that theory was turned upside down with the demonstration of **in vitro cell rejuvenation**.

In **2011**, cells from a **100-year human** were rejuvenated back to youth.

In **2022**, a similar technique (using Yamanaka transcription factors) was used to partially **reverse** aging in live animals.

Human trials are now being pursued.

The box below shows the timeline in the development of **cellular reprogramming** using transcription factors.

**Cellular Reprogramming**

--> **Rewriting the Rules of Biology** | <https://pubmed.ncbi.nlm.nih.gov/33627519>

- > **2006**: cell reprogramming demonstrates **cellular rejuvenation**.
- > **2011**: Rejuvenation induced in very old **human** cells (*in vitro*)
- > **2022**: **100% of Human Genome** sequenced.
- > **2022**: Aging partially **reversed** in live mice (in vivo)
- > **2022**: Research underway to **rejuvenate old humans**.

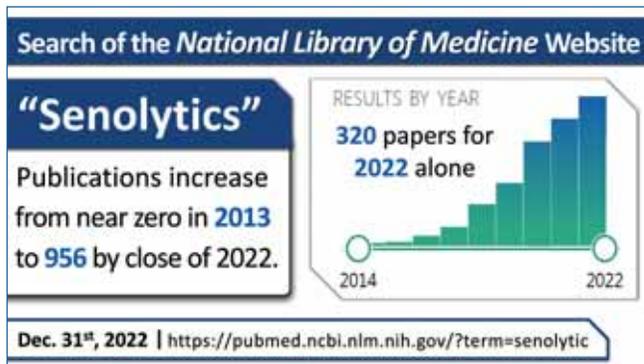
Prior biology doctrine: Cell **aging** irreversible...**rejuvenation** not possible.

## Reducing the Senescent Cell Burden

For my keynote presentation, I planned on showing many new slides about **senolytics** (compounds that remove toxic **senescent cells** from the body).

Realizing there was insufficient time, I showed a chart from the **National Library of Medicine** that revealed near zero published papers about **senolytics** in **2013** and over **800** by mid-2022.

The chart below is updated to reflect all published studies that mention **senolytics** in **2022**.



A vaccine is being investigated that may enable one’s aged immune system to remove senescent cells, thus eliminating the need for senolytic compounds.

**A Vaccine Eliminates Senescent Cells**

LongevityTechnology

December 13<sup>th</sup>, 2021

David A. Sinclair AD PhD @dasilincir

Okay, this is a big deal: Vaccinations against aging work. Sure, it's a proof-of-principle study in a rapidly aging mouse, but there's little doubt this will be possible in us one day. Link 1/3

<https://www.longevitytechnology/a-vaccine-for-aging-that-eliminates-senescent-cells>

A book published in **2022** called **“Ageless”** described ways to achieve super-longevity including using senolytics. **Sanjay Gupta, M.D.** gave it a nice endorsement.

**Senolytics** described in new book.

“I don't think there is any kind of absolute cap on how long we can live.”  
 — **Dr. Andrew Steele**  
 British Computational Biologist

“A fascinating look at how scientists are working to help doctors treat the aging process itself, helping us all to lead longer, healthier lives.”  
 — **Sanjay Gupta, MD**

**Ageless**  
 The New Science of Getting Older Without Getting Old  
 Andrew Steele

## Intermittent Fasting

Studies evaluating the broad-spectrum benefits of various forms of **time-restricted eating** continue to be largely consistent.

The potential value of intermittent fasting in cancer prevention is being continually corroborated as well as its role as possible adjuvant treatment.



**Fasting-mimicking Diet and Anti-tumor Immunity**

Cancer patients took up a 5 day, plant-based, calorie-restricted (low-carb/protein) diet.

It resulted in **reduced median plasma glucose** concentration by **18.6%**, serum **insulin** by **50.7%** and serum **IGF-1** by **30.3%**.

The reduced plasma glucose, insulin and IGF-1 was found to be crucial to down-regulating immunosuppressive myeloid cells and enhancing intra-tumor T cell cytotoxicity.

“...our results provide first evidence that five-day FMD produces systemic immunological effects that are associated with the activation of several antitumor immune programs at the tumor level in human cancers.”

Jan. 12<sup>th</sup>, 2022 | <https://cancerdiscovery.aacrjournals.org/content/12/1/90>

Another study provided further validation of the general benefits of a fasting-mimicking diet in demonstrating significant **weight loss** and improvements in glycemc (diabetic) blood markers.

**As Reported in the Journal of Clinical Endocrinology & Metabolism**

**Effects of 6 Month Periodic Fasting in Patients With Type 2 Diabetes & Diabetic Nephropathy**

**One week each month, modest low-carb, very low-protein diet:**

A Diet Plan of:	Resulted in:
Day 1 ≈ 1100 calories	✓ 22 pounds of weight loss
Days 2-5 ≈ 700 calories	✓ 1.4% decrease in A1C
Day 6 ≈ Normal intake	✓ 59% improved insulin sensitivity
	✓ 67% of people reduced diabetic drug dose

June 5, 2022 | <https://doi.org/10.1210/clinem/dgac197>

## Rapamycin

Several speakers presented the potential longevity benefits of **rapamycin**, a drug that has extended lifespan in virtually every model tested.

I focused on a newly identified mechanism of rapamycin, which is to reduce the error rate of cellular **protein synthesis** that occurs with normal aging.

The box below describes the importance of this finding.

**Increased Fidelity of Protein Synthesis Extends Lifespan**  
Major Findings Published in Cell Metabolism November 2, 2021

The paper's authors emphasize that the baseline rate of error in protein synthesis can be **hundreds of thousands of times** more than the DNA mutation rate. Making it a major neglected aspect of aging.

"We show that anti-aging drugs such as rapamycin, Torin1, and trametinib reduce translation errors, and that rapamycin extends further organismal longevity in RPS23 hyper-accuracy mutants. This implies a unified mode of action for diverse pharmacological anti-aging therapies."

**NORMAL** DNA Mutations Very Rare

**RNA** Mutates 40x More Often

**PROTEIN** Added 25x More Errors

[https://www.cell.com/cell-metabolism/fulltext/S1550-4131\(21\)00417-4](https://www.cell.com/cell-metabolism/fulltext/S1550-4131(21)00417-4)

Two rapamycin **clinical trials** were described with results expected soon on the first of two **human** studies announced.

The primary outcome for the first study evaluates changes in **visceral fat** in response to **weekly** rapamycin doses of **5 mg** or **10 mg**. Secondary measures will assess **bone density** and other aging measures using blood tests as shown on the slide below.

March 5<sup>th</sup>, 2022 | National Institutes of Health - Clinicaltrials.gov listed study

**Rapamycin Human Study Receives \$485,000 Funding**

- ▶ Randomized, placebo-controlled trial into the safety/efficacy of rapamycin in reducing clinical measures of aging in an older adult population.
- ▶ Two differing doses: **5 mg** or **10 mg** of rapamycin one time a week or placebo.
- ▶ Primary Outcome Measure: Changes in **visceral fat** as measured by (DXA) scan.
- ▶ Secondary Outcomes: Range of clinical measures, e.g. **bone density**, blood tests, etc.
- ▶ > 50 people enrolled at **\$360** each (original cost before donations was **\$1,200**).

Principal investigators: **James Watson, M.D.** and **Sajad Zalzala, M.D.**  
Sponsor: **AgelessRx** Collaborator: **University of California, Los Angeles**

The second study being conducted at the **Mayo Clinic** will assess the effects of **rapamycin** on **cardiac function** in frail older adults.

Two registries have been established to enable people self-experimenting with **rapamycin** to report the benefits and any side effects they may be encountering.

The first slide on the next column describes a **Mayo Clinic** clinical trial that measures **cardiac function** effects of **rapamycin** given to frail older people.

The next two slides on the right side column describe the **rapamycin registries**.

May 24<sup>th</sup>, 2022 | National Institutes of Health – Clinicaltrials.gov listed study

**Effect of Rapamycin to Improve Cardiac Function in Frail Older Adults**

- ▶ To see if rapamycin will **improve heart's ability to pump** by improving oxygen consumption.
- ▶ Pilot, proof-of-concept study. Patients 60 years or older with invasively proven heart failure.
- ▶ Subjects with hsCRP levels  $\geq 2\text{mg/L}$  will undergo treatment with open label rapamycin.
- ▶ Efficacy outcomes will be measured at baseline and at 6 months.
- ▶ Safety will be assessed by remote video monitoring.
- ▶ Rapamycin levels ( $\leq 4\text{ng/mL}$ ) measured twice-a-month first month/ then monthly for 5 months.

Principal investigator: Mandeep Singh ----- Sponsor: **Mayo Clinic**  
<https://clinicaltrials.gov/ct2/show/NCT04996719>

**Rapamycin.io**

Rapamycin Human Longevity Open Registry >> 2022<<

"The Rapamycin Human Longevity Open Registry is a worldwide initiative to collect data on individuals using rapamycin for longevity through a series of online surveys in order to build the largest and most comprehensive global collection of information on this topic to date. It is the first online patient-driven registry for rapamycin usage, with individuals taking the drug driving the collection of data."

To Help Enhance Research Efforts VISIT: [www.Rapamycin.io](http://www.Rapamycin.io)

**University of Washington Rapamycin Study**

<https://www.rapamycinstudy.org/>

"Our goal is to assess the impact of rapamycin use on healthy people and disseminate these findings for the benefit of everyone."  
- Dr. Matt Kaeberlein, Dr. Jonathan An and Dr. Alan Green

This research has been funded by an Impetus Grant

A book about rapamycin was published in **2022** and serves as a primer for those not familiar with data showing that rapamycin **extends lifespan** in virtually every species tested.

The book (item #34189) costs \$14.95 and can be ordered by calling **1-800-544-4440** or logging on to [www.LifeExtension.com](http://www.LifeExtension.com)

**Up to 60% increase in life expectancy (in middle-aged mice)**

**RAPAMYCIN**  
The Most Promising Life Extension Drug

Rapamycin, mTOR, Autophagy & Treating mTOR Syndrome

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8814613/>

## Rejuvenating Aged Bone Marrow

Grim findings about what happens to bone marrow **stem cells** as we age are outlined on the following two slides. They were not shown during my time-limited talk at RAADFest.

**What Happens to Bone Marrow After You Turn 70?**  
July 27th, 2022

Unmutated Cells → Driver Mutation Laden Cells → Competition for Cell Production

“...the drastic **reduction** in **blood production** beyond the age of 70 is likely caused by **genetic alterations** that **steadily accumulate** in **blood stem cells** throughout life.”

“...the diversity of blood stem cells is **lost** in **older age** due to positive selection of **faster-growing clones** with **driver mutations**.”

<https://scitechdaily.com/scientists-unlock-the-secrets-of-cellular-aging-what-happens-after-you-turn-70/>

**What Happens to Bone Marrow After You Turn 70?**

“...**chronic inflammation**, smoking, infection, and chemotherapy cause earlier growth of clones with **cancer-driving mutations**.”

“In every elderly person investigated, a small number of enlarged stem cell clones—as few as **10 to 20**—contributed as much as **half** of the total blood output.”

“We’ve shown, for the first time, how **steadily accumulating mutations** throughout life lead to a catastrophic and inevitable change in blood cell populations after the age of **70**.”

Competition for Cell Production

July 27th, 2022 | <https://scitechdaily.com/scientists-unlock-the-secrets-of-cellular-aging-what-happens-after-you-turn-70/>

I then revealed encouraging news about what scientists are doing to combat loss of youthful **stem cell function** in aged **bone marrow**.

**Can Restoration Of Aged Hematopoietic Cells Reverse Age-related Disorders?**  
LongevityTechnology | July 22, 2022

“...the restoration of the aged **hematopoietic** system can help to reverse and prevent several age-associated disorders and also enhance responses to infection and vaccines.”

<https://longevitytechnology.com/restoration-of-aged-hematopoietic-cells-reverse-age-related-disorders>

I presented a **2022** study (top of next column) showing that infusion of bone marrow (hematopoietic) **stem cells** into mice with sepsis markedly improved survival.

This approach is not yet available for **sepsis** patients, but research is being planned to help rejuvenate aged **human** bone marrow.

**Shortage of Regulatory Immune Cells Implicated in Sepsis Mortality**  
Feb. 15, 2022 | Stem Cell Infusion Treatment Reduces Mortality 50-60%

Sepsis accounts for **1 in 5 deaths** worldwide and is a common final pathway for many disease processes such as cancer, diabetes, and cardiovascular disease.

In a mouse model, sepsis was associated with significant **depletion** of **hematopoietic stem** and progenitor cells (**HSPCs**) and mortality within 5–7 days.

**HSPC infusion** restored HSPC levels and saw an increase in myeloid-derived suppressor cells and a dampening of systemic inflammation thought to cause the **50-60%** overall **survival improvement**.

[elifesciences.org/articles/74561](https://elifesciences.org/articles/74561)

I next described human research initiatives that aim to regenerate human aged **hematopoietic** and **mesenchymal** stem cells with the objective of inducing **systemic rejuvenation**.

**Research using Autologous Stem Cells + Transcription Factors**

Human project initiated in 2022:

**Step 1:** Remove **old cells** from circulating **blood**.

**Step 2:** Use **transcription factors** to transform the **autologous old** cells back to **youthful** structure/function.

**Step 3:** Reinfuse the **reprogrammed** autologous stem cells to induce **systemic regeneration**.

Pilot studies are evaluating safety and regenerative efficacy

## Regenerative Effects of Young Plasma

When **young blood** is continuously circulated into **old rodents** (parabiosis), multiple regenerative effects occur, and lifespans are often lengthened (as much as 10-12 human equivalent years).

One aspect of aging that **young blood** had not shown to improve was **immune senescence**.

A **2022** study demonstrated for the first time restoration of **hematopoietic stem cell function** in response to parabiosis (young blood) therapy in rodents.

**Heterochronic Parabiosis Induces Stem Cell Revitalization and Systemic Rejuvenation Across Aged Tissues**  
As Published in Cell Stem Cell | June 2nd, 2022

**Research Highlights:**

“Rejuvenating factors” identified in **young blood**.

Youthful **hematopoietic stem cell function** restored.

**Immune senescence** of **lymphocytes** mitigated.

<https://doi.org/10.1016/j.stem.2022.04.017>

Continuously circulating **young blood** into old people is not practical.

What scientists have been doing is identifying factors in young blood that induce rejuvenation in older animals.

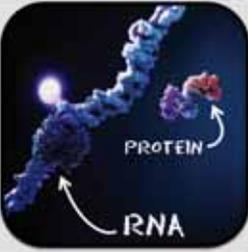
The beneficial microRNA and other proteins from **young** blood cells can then be synthesized to make them widely available to **reverse aging** processes in maturing **humans**.

**As Featured in New Scientist March 10, 2022**

**We May Now Know Why Young Blood Can Have Rejuvenating Effects**

Packages of **RNA** and **proteins** that bud off from cells have **reversed** some signs of aging in mice, and they may account for the rejuvenating effects of **young blood**.

"...it **reversed** several signs of aging, including boosting muscle strength and hair growth and improving coordination and endurance."



**PROTEIN**  
**RNA**

<https://www.newscientist.com/article/2311876-we-may-now-know-why-young-blood-can-have-rejuvenating-effects/>

I next presented a study published in **September 2022** that I helped to fund. A concentrate from **human umbilical cord plasma** was injected into older people for 10 continuous weeks.

**Human Study**

**"Umbilical cord plasma concentrate has beneficial effects on DNA methylation GrimAge and human clinical biomarkers"**

- 18 human participants average age 74 years.
- Safety-efficacy evaluated with blood tests + GrimAge® epigenetic clock.
- Weekly injection of **umbilical cord plasma concentrate** into muscle for **10 weeks**.
- Each injection equivalent to 100 mL umbilical cord plasma infusion. (Four umbilical cords used to produce each weekly injection.)



**Aging**

September 02, 2022 | <https://doi.org/10.1111/ace.13696>

The objective of these studies is to identify the safety/efficacy of very young (umbilical cord) plasma and then synthesize the regenerative factors so that **all** elderly people will someday be able to enjoy varying degrees of rejuvenation.

**Umbilical cord plasma concentrate has beneficial effects on DNA methylation GrimAge and human clinical biomarkers**



**Safety** ✓

**Clinical Biomarkers**

**DNAm GrimAge** ↓

Once per week, 10 weeks

From research published in *Aging Cell*

September 02, 2022 | <https://doi.org/10.1111/ace.13696>

This pilot study showed indicators of **age-reversal** after only 10-weeks of administering the concentrate derived from **umbilical cord** plasma.

**Umbilical cord plasma concentrate has beneficial effects on DNA methylation GrimAge and human clinical biomarkers**

September 2nd, 2022 | <https://onlinelibrary.wiley.com/doi/10.1111/ace.13696>

- GrimAge®: **-0.78 years younger** (predictor of death risk)
- Kidney function: **7% improvement** measured by eGFR (+ 5)
- **30% of 90 biomarkers** changed beneficially, zero negatively
- Phenotypic Age Score biomarkers such as RDW and MCV improved, reducing predicted age
- **No significant side effects**



For those not familiar with a blood test that measures biological aging, I created a slide (on this page) showing the predictive power of a test called **DNAm Grim Age**. This is currently an expensive test only available to researchers, but I explained later how one can obtain surrogate results at no charge with basic **blood tests**.

**New Studies Demonstrate Predictive Power of Epigenetic Clocks**

"DNAm GrimAge is a strong predictor of mortality independent of genetic influences among female twin pairs."<sup>1</sup>

"GrimAge Outperforms Other Epigenetic Clocks in the Prediction of Age-Related Clinical Phenotypes and All-Cause Mortality."<sup>2</sup>

2021 findings corroborate data published 2019-2020



1. [Clinical Hypertension journal | ajh.onlinelibrary.wiley.com/doi/10.1111/ajh.13112](https://doi.org/10.1111/ajh.13112)

2. [Academic.oup.com/aje/advance-article-abstract/doi/10.1093/aje/kwz253](https://doi.org/10.1093/aje/kwz253)

## The Betterhumans Research Group

A nonprofit group (Betterhumans.org) that I help fund is making remarkable progress.

They have a team of scientists working around the clock to validate practical methods that elderly people can utilize to **reverse** indices of degenerative aging.

I encourage those with the wherewithal to make tax-deductible donations to contribute to Betterhumans.org group so they can initiate more age-reversal clinical research.

The slide at the top of the next column shows construction of Betterhumans new research facility.

The Betterhumans building you see on the next page is nearly finished now (beginning of 2023).

**Construction of New Research Facility in Texas**

Betterhumans new facility will be a **28,000 sq. ft** Age Reversal Vivarium and Diagnostic Lab.

Pictured is the construction of four of the six planned 20' by 40' lab rooms.



### Therapeutic Plasma Exchange

Another method being studied to control **aging** is to undergo a process called “plasma apheresis” which is used in clinical practice today for autoimmune disorders.

On the main RAADFest stage, Dr. Kiprof acknowledged the recruitment campaign I organized to find study subjects for his ambitious clinical trial. The treatment is called **Therapeutic Plasma Exchange**.

**LYFSPN Pilot Study of Plasmapheresis Aims for Longevity Gains – Age Reversal**

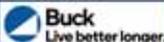
In the Bay Area, *Lyfspan* has initiated a **plasmapheresis** human clinical trial that aims to demonstrate the **rejuvenation** and **lifespan improving potential** that was previously shown in animal models.



Dr. Dobri Kiprof, M.D., M.P. (JGCP), Co-founder of Lyfspan  
https://www.lyfspan.com/#Pilot

https://longevitytechnology/news/be-part-of-bringing-plasmapheresis-to-life/

Dr. Dobri Kiprof’s research group (Lyfspan) is working with the prestigious **Buck Institute** on a study in which older people will undergo one of three different **apheresis protocols** to remove senile plasma proteins and replace them with fresh, healthy albumin plus immunoglobulins.

**Buck Institute for Research on Aging**  **Live better longer.**

**Live better longer.**

“The **Buck** is a collective of the world’s top scientists in the field of **aging** who are sharing their methods and expertise to find ways to help everyone lead fuller, healthier lives by **ending age-related disease.**”

<https://www.buckinstitute.org/>

### Offshore Medical Practices

A growing number of medical facilities are being established in Nassau, Bahamas due to its proximity to the United States and longstanding relationships that U.S. physician/scientists have maintained with their Bahamian counterparts.

**Offshore Medical Practices**

**Nassau, Bahamas (and other countries)**

Updates on offshore options at: [www.age-reversal.net](http://www.age-reversal.net)



The next slide on this page is a compound (former U.S. Consulate office of sorts) that the **Age-Reversal Network** group leased. It serves as a staging ground to plan potential age-reversal medical opportunities at several established clinics in The Bahamas. It also has free bedrooms for patients of these clinics to stay in who cannot afford hotel rooms.



Those interested in medical treatments available in other countries should log on to: [www.age-reversal.net](http://www.age-reversal.net) and provide contact information to stay informed.

### Lives Lost because of Over Regulation

The most tragic barrier delaying lifesaving progress is excess regulation of clinical (human) research.

On top of the next page is a slide that chronicles the multi-decade delay in recognizing the benefits of one drug (metformin):

### Deadly Delays... Urgent Need for Reform

- England approves metformin: 1957
- FDA approves metformin: 1994
- 37-year delay caused millions of American deaths.
- 65 years later most people don't know metformin is anti-aging drug.

Regulatory Barriers Must be Abolished!

I created an online document to petition the **FDA** to remove bureaucratic roadblocks that are delaying regenerative medicine **clinical trials**. In many cases, the red tape is keeping promising human studies from even launching.

I ask readers to log on to: [www.age-reversal.net/FDA](http://www.age-reversal.net/FDA) to sign on to this petition that will be used to amend clinical trial requirements so that rapid-fire human studies can launch.

### Bridging the Longevity Gap

Urgent Need to Reform Clinical Trial Regulations

Log on to: [www.age-reversal.net/FDA](http://www.age-reversal.net/FDA) to sign on to a petition to help amend clinical trial requirements.

### Lethal Impact of Delayed Biomedical Technology

The slides on this page show the premature death of **Lyndon Johnson** (at age 64) and how similarly situated leaders of this country with **coronary artery disease** are living to age 76 and beyond because of advances in **biomedical technology**.

I then postulated that elderly people today are in the same predicament, i.e., we are **aging** to death when potential cures for biological aging may be less than a decade away.

My emphasis is the need to accelerate **rejuvenation research** with more funding and less governmental regulation over clinical trials.

### Lyndon Johnson Prematurely Died Due to Technology Delay

- First heart attack age 46 (1955)
- Suffered chronic angina pain
- Resigned re-election age 59 (1968)
- Dead age 64 years (1973)

(Conventional treatments lacking in LBJ's era)

### Alive Because of Biomedical Technology

<b>Bill Clinton</b> Coronary Bypass Age 58 <small>In 2004</small> Coronary Stent Age 63 <small>In 2010</small> Age 76 Today	<b>George W. Bush</b> Coronary Stent Age 67 <small>In 2013</small> Age 76 Today	<b>Dick Cheney</b> Coronary Bypass Age 47 <small>In 1988</small> Coronary Stent Age 59 <small>In 2000</small> Ventricular Assist Age 69 <small>In 2010</small> Heart Transplant Age 71 <small>In 2012</small> Age 81 Today
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### Bad News:

We are in similar predicament as LBJ in 1955-1973.

### Good News:

Age-reversal science is rapidly advancing.

Lyndon Baines Johnson  
1908-1973

### Triumphs and Tragedies

The period from October 2021 to October 2022 was a year of scientific triumphs and needless tragedy.

We lost a dedicated long-term supporter to **type II diabetic** complications and I am determined to STOP these kinds of preventable tragedies.

Urgent Need for Patient Empowerment

Dedicated RAADfest & Longevity Supporter

### A Needless Death

Vincent Stona  
1955-2022

I emphasized during my talk that those with health problems who ignore my dietary and medication suggestions may fail to achieve their super-longevity objectives.

As much as I despise most elements of **Big Pharma**, every once in a while they develop a medication whose benefits outweigh side effect risks.

One of these is a drug class to reduce type II diabetic complications called **SGLT2 inhibitors**. I presented many slides on this class of drug that you can view at [www.AgeReversal.net](http://www.AgeReversal.net)

If you have less than optimal **glycemic control**, I urge you to consider a **SGLT2 inhibitor** drug like **Jardiance®** in addition to **metformin**.

**Know Your Glycemic Blood Markers**

Target Interventions to Achieve:

- ▶ **Fasting Glucose:** 80 to 86 mg/dL
- ▶ **Fasting Insulin:** <5.0 to 7.0 uIU/ml
- ▶ **Hemoglobin A1C:** 5.0 to 5.4%

### A Biological Age Estimate using Low Cost Blood Tests

A university research team has developed an algorithm to estimate one's **biological age** with results available from a **CBC/Chem + C-reactive protein** blood test.

Known as the **Levine-Horvath Phenotypic Age Model**, it was developed using blood test data to estimate future morbidity and mortality in nearly 10,000 people over a 23-year period.

**Levine-Horvath Phenotypic Age Model**

**No Cost with CBC/Chem + C-reactive protein test**

- ▶ 'Phenotypic Age' estimate based on clinical measures of **9,926** adults with complete biomarker (blood test) data
- ▶ Analyzed data from over **23 years** of **mortality** follow-up
- ▶ Advanced computational/statistical methods used to identify 9 phenotypic blood test markers to predict **morbidity/mortality risk**

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5940111>

This **Phenotypic Age Model** is not fully validated to predict biological aging at an individual level. Results from **comprehensive** blood test panels provide more reliable data in our opinion about one's future morbidity/mortality risks.

The slide below shows my score using calculations from the **Levine-Horvath Phenotypic Age Model**. It indicates my **biological age** to be about **11 years younger** than my chronologic age.

**Bill Faloon's phenotypic (biological) age calculation:**

Albumin	4.5 g/dL
Creatinine	.93 mg/dL
Glucose	95 mg/dL
CRP	.27 mg/L
Lymphocytes	29%
MCV	93 fL
RDW	12.7%
Alka phosphatase	40 u/L
White Blood Cells	3.8

**These results equate to:**  
**11.12 -year younger phenotypic-age compared to chronological age**

"An epigenetic biomarker of aging for lifespan and healthspan" - www.ncbi.nlm.nih.gov/pmc/articles/PMC5940111

This calculation is available at no extra cost for those who order a blood test panel that provides everything needed for the **Levine-Horvath** age model + fasting insulin, A1C, lipids, and other health measures.

Commercial labs charge over **\$500** for these tests, but readers of **Life Extension Magazine®** can obtain this test panel for only **\$77**.

Once you order this test, you are immediately sent a requisition and list of local blood draw centers throughout the U.S. Results come back quickly and will include the **Levine-Horvath** calculation of your **biological age**.

To order, call 1-800-208-3444 (24 hours) or log on to: [www.LifeExtension.com/blood](http://www.LifeExtension.com/blood)

**Blood Tests to Calculate Phenotypic Age:**

**Complete Blood Count-Chemistry and C-reactive protein**

Added tests:  
**A1C + Lipids + Fasting Insulin**

**Commercial Lab: \$572**  
**LifeExtension®: \$77**  
**+ Phenotypic Age at no cost**

Note this surrogate measure of one's **biological age** is not the same as the **GrimAge** test described earlier in this article.

I continue to discuss the validity of the **Levine-Horvath Phenotypic Age Model** with experts in the field. What's nice about the Phenotypic Age Model is that its calculations are based on results from blood tests readers of this magazine already utilize on a regular basis.

## Additional Topics in My Keynote Presentation

So far, I've presented less than half of the many areas of longevity research and practical applications that occurred since RAADfest 2021.

You can view my RAADfest presentation at: [www.age-reversal.net](http://www.age-reversal.net) (in video or PowerPoint format) that will cover:

- Massive weight loss with GLP-1 prescription drugs
- What is an Optimal diet? (Live 3 to 13 years longer)
- What's Behind Surging Deaths from Heart disease?
- Impossible become possible... Million Times Faster Computation
- Brain Implant Operates Digital Devices (Mind/Cloud interface)
- Elon Musk Predicts Humans can Live Forever
- Record numbers of Famous Dead Billionaires
- Lethal Impact of Elevated Glucose
- SGLT2 Inhibitor drugs protect kidneys, heart, and brain while lowering glucose and A1C.

## Annual RAADfest Conference

**RAADfest** is a **nonprofit** conference whose purpose is to enable aging people to live in good health far *longer* than most anyone can imagine today.

This annual event enables people to stay informed and connect with many of the best doctors, scientists and thought leaders in the field.

**RAADfest 2023** will be held in **Los Angeles, California** September 7-9, 2023.

RAADfest 2023 will begin Friday evening and continue all day Saturday with formal presentations going until 3 pm on Sunday. Informal gatherings will occur throughout the Friday-Sunday period.

The registration fee that includes two organic meals and cancellation insurance is **\$647** for LifeExtension readers. (Use code "LEF" to obtain this discounted registration price.)

To learn more or reserve your place at **RAADfest 2023**, log on to: [www.Raadfest.com](http://www.Raadfest.com)

## In Summary...

It is a **privilege** and downright fun to interact with scientists on the front lines of regenerative medicine research.

Our mutual objective is to save **human** lives including our own.

Those interested in receiving email updates about research projects can register at no cost at: [www.age-reversal.net](http://www.age-reversal.net)

I conclude by asking those who are able to make charitable donations to the **Human Age Reversal Project**.

All donations will only be used to fund actual study costs and not salaries or overhead expenses.

Over **\$1 million** has been raised and nothing will be spent until multi-intervention age-reversal projects commence. (See the slide below.)

Welcome to our fantastic voyage!

For longer life,



William Faloon, Volunteer  
Age Reversal Network\*

\*The Age Reversal Network is a public benefit group that consists of physicians, scientists, activists, and participants in regenerative medicine research. These individuals share a common desire to rejuvenate aged people. To receive free updates that are sent out every 3-4 weeks, log on to: [www.age-reversal.net/join](http://www.age-reversal.net/join)

## Donate to Human Age Reversal Project

Fund Research with Tax-Deductible Donations

### Human Age Reversal Project

Make checks payable to:

**Human Age Reversal Project**  
3600 West Commercial Blvd.  
Ft. Lauderdale, FL 33309



Or donate online at:  
**age-reversal.net/donate**

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**Carnosine**, **benfotiamine**, and **pyridoxal-5-phosphate** are powerful nutrients that help inhibit cellular glycation.

**PQQ** and **R-lipoic acid** promote healthy cell energizing **mitochondria** function.

**Mitochondrial Energy Optimizer** provides a spectrum of nutrients at a fraction of the cost of buying them individually.

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

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"Oh, I LOVE this!  
I noticed my pants  
are looser."

**Adela**

VERIFIED CUSTOMER  
REVIEW



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

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

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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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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.

# William Shatner

## Stem Cells and other Methods to Fight Aging

BY LAURIE MATHENA



© GETTY IMAGES / ETHAN MILLER / STAFF

William Shatner rose to fame in his role as Captain James T. Kirk on the TV series *Star Trek* in the 1960s.

Now, more than half a century later, the **91-year-old** actor has become the embodiment of the legendary phrase, *“live long and prosper.”*

His career as an actor, director, singer, and author spans seven decades, and includes a Golden Globe and two Emmy Awards.

He has written **30** books, recorded 8 albums, performed on Broadway, and has participated in more than 250 television shows, movies, and plays.

In recent years, his personal life has taken center stage.

Shatner is a well-respected breeder of world champion horses, and at age **89**, he rode one of his horses to an amateur World Champion title.

At **90**, Shatner became the oldest person ever to fly into space, traveling as a passenger on **Jeff Bezos’** spaceship, Blue Origin.

Now, at **91** years old, he maintains a zest for life and sharp wit that has left many people asking, what’s his secret?

## Shatner's Longevity Secrets

William Shatner has a signature sense of humor that has become as synonymous with his name as Captain Kirk.

So, when asked his secret to a good, long life, it's hardly surprising that Shatner offered these words of wisdom:

"Don't die. That it; that's the secret," he said in his book, *Live Long And...* "Simply keep living and try not to slow down."

But a closer look at his life reveals that Shatner implements many key life-extending practices shared by the world's longest-living "Blue Zone" communities. This includes lifestyle habits like living with purpose, getting lots of natural movement, eating a more plant-based diet, and prioritizing family.

Most recently, he received a stem cell treatment designed to systematically deliver restorative factors throughout his body.

Shatner's therapy involved intravenous infusion of stem cells manufactured in Southern California.

Stem cell treatment has not been approved by the FDA for the treatment of any specific disease. Ongoing research has focused on treating immune disorders, metabolic diseases, neurological impairments, aging, and more.

When **Shatner** announced his **stem cell treatment** on the popular social media platform, Twitter, he said, "Is it possible to turn back the clock? I will let you know."

On **November 21, 2022**, an announcement was made by the **California Institute of Regenerative Medicine** that **\$8 million additional** dollars were allocated to conduct more **human stem cell research** initiatives.

### Living Your Passion

Not long after receiving the stem cell therapy, Shatner became the oldest person to travel into space.

This 10-minute, 17-second journey changed his perspective on life.

"I was so thoroughly unprepared for this experience. It was among the strongest feelings of grief I have ever encountered," said Shatner in his new book *Boldly Go*.

"Going into space made me so aware of how fragile our lives are here on Earth, how we need each other, and need to continue to strengthen bonds that connect us to each other. Because out there, there is no life. There is no us."

The journey was also physically demanding.

Traveling at more than 2,000 MPH, passengers experience 5.5 Gs of force—which feels like five times their body weight pressing on their chests, making it difficult to breathe or move.

Passengers must also be able to pass a fitness test prior to the flight, which consists of climbing seven flights of stairs in a minute and a half.

How has Shatner remained robust enough to endure such intense physical strain? He would likely say it's by riding his beloved horses.

November 21, 2022

## UC San Diego Awarded \$8 million To Expand Stem Cell Human Trials

**Alpha Stem Cell Clinic** at UC San Diego is a network of **stem cell clinics** in California.

California Institute of Regenerative Medicine awarded Alpha **\$8 million** in additional funding to conduct **human stem cell research**.

This comes to **\$72 million** in recent funding from the **California Institute of Regenerative Medicine**.

### Alpha Stem Cell Clinics:

- City of Hope
- ACT-1
- CIRM Alpha Clinics
- UC Davis Health
- UCLA UCI
- UC San Diego Health
- UCSF Alpha Stem Cell Clinic

[health.ucsd.edu/news/releases/Pages/2022-11-21-uc-san-diego-awarded-8m-to-expand-stem-cell-therapy-clinical-trials.aspx](https://health.ucsd.edu/news/releases/Pages/2022-11-21-uc-san-diego-awarded-8m-to-expand-stem-cell-therapy-clinical-trials.aspx)



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## Staying Active

“I ride two to three hours every morning that I’m not working—two to three days a week,” Shatner said in an interview with the *LA Times*. “Riding is a stretching and strengthening exercise. It requires balance, expertise, finesse, and strength.”

Horseback riding also gives him the *motivation* to keep himself fit.

“I wake up every morning thinking, ***I’ve got to keep myself in shape to ride horses***,” Shatner said. “If I am not sitting on a horse at least once or twice a week, it feels detrimental to my heart.”

Riding horses has become one of Shatner’s greatest passions—and it all began by accident. While attending a horse auction, he made a gesture that was mistaken for a bid.

Too embarrassed to back out of the purchase, Shatner went home with his first horse.

“That happy accident led to a part of my life that has brought me so much joy I can scarcely believe it; it sometimes makes me cry just to think about it,” said Shatner. “Today, at **age 91**, I am a **better rider** than I’ve ever been.”

Shatner has ranches in Kentucky and California, where he breeds and shows world-champion Saddlebred and Quarter horses. He regularly competes with these horses in riding and cart-driving competitions.

As recently as **2019**, Shatner won the title of **world champion** in the Amateur Roadster to Bike Championship at the Kentucky State Fair with one of his Saddlebred horses. He has also won reining awards showing his Quarter horses.

His passion for horses and people led him to start the Hollywood Charity Horse Show in 1990, a yearly fundraiser that supports local and national children’s and veteran’s charities.

According to Shatner, the charity raises \$400,000-\$500,000 per year, and **100%** of the donations goes to the 501c3 charities he has selected.

## Family and Fun

In addition to horseback riding, Shatner exercises in the pool for 30 minutes a day, running in place and doing arm and leg exercises.

He also minds what he eats, saying, “I try to adhere to a more plant-based diet these days, with occasional exceptions, and if I am to fish, it must only be for food. Never for sport.”

Shatner has a youthful wonder about life that pushes him to constantly try new things.

For example, when he was in his mid-80s, Shatner purchased his first electric bike for himself and his wife, Elizabeth, and they routinely go on 20- to 30-mile excursions.

An e-bike has a motor that assists you when you're pedaling.

"The e-bike got me outside and got me fitter," he told the *LA Times*. "Going up the hills is not a problem. I've got an arthritic back from all the horseback riding, my muscles are tender, yet I go back to my car when the bike ride's over and I feel perfect."

This has not only kept him active but has also provided an activity he can enjoy with his entire family.

Shatner regularly bikes with more than a dozen of his family members over the hills of Santa Barbara. With this new shared hobby, "a family that was always somewhat tight became a hugely cohesive group," explained Shatner to AARP.

## Future Plans

For Shatner, remaining active—physically, professionally, and socially—is part of his unofficial longevity program.

"I know that good, healthy aging comes from not being solitary or brooding," he said in an article in *Newsmax*. "Say yes to the opportunities life is offering. Say yes to life, yes to dinner, yes to going out, and yes to something new. Because time is too short to lose one opportunity to sacrifice another."

He also continues to say yes to work.

Since turning 90, Shatner released the book, *Boldly Go*, he recorded a self-titled album called "Bill", was the star guest at the 2022 LA Comic Con, and he's working on a documentary detailing his trip into space.

He is also the host and executive producer of a documentary series on **The History Channel** called *UnXplained*, a non-fiction series that explores the mysteries of the world.

Shatner has been through many desperate times in his life—out of work, broke, divorced, living in his car with his dog.

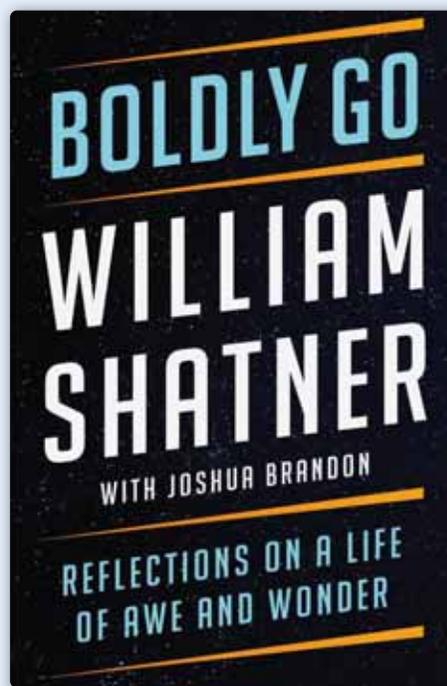
Yet he never stopped pursuing the acting career he believed was his calling, and never took any of his successes for granted.

Perhaps that is why, now that he is in his ninth decade, Shatner has such a zest for life, a thirst for knowledge, and a deep appreciation of the world around him.

"If you allow yourself to be awed by life, to keep drinking in its limitless knowledge, to keep striving

for answers, to enjoy the beauty around us at every moment, to never stagnate... well, then you might find yourself living for a very long time, and, ideally, prospering," said Shatner. "Or, in the absence of the longevity and self-defined prosperity you seek, you might well find meaning, or even better, happiness." •

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



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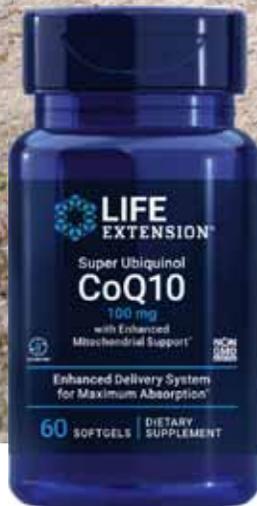
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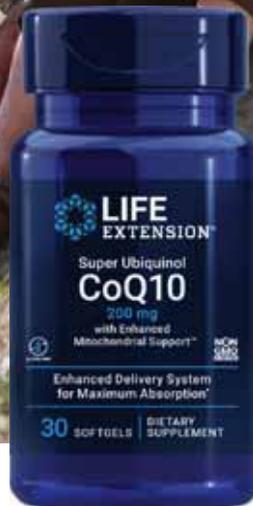


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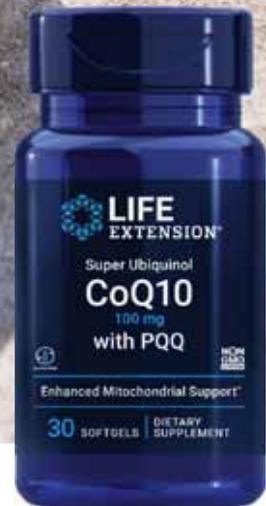


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