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LifeExtension.com

February 2025

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REPORTS



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**How Many Nutrients
are in Your Diet?**

Credentialed “experts” claim that people can get their **vitamins** and other vital nutrients in their **diet**.

A closer look at these allegations reveals a serious misunderstanding of the **nutrient content** of even healthy dietary patterns.



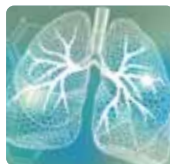
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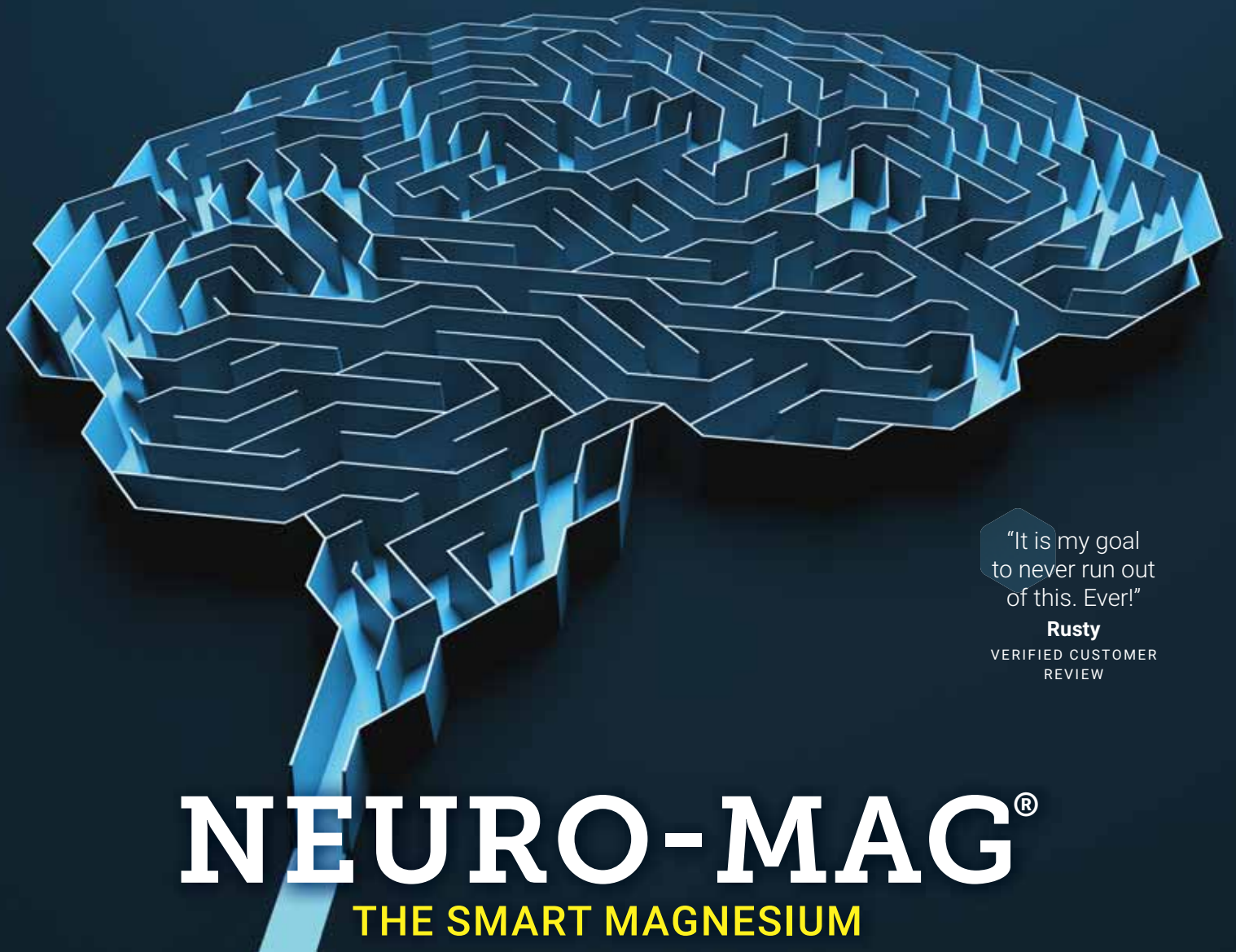
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The Food and Vitamin Controversy



WILLIAM FALOON



Published data continue to validate the favorable impact of the right **dietary** choices on healthy **longevity**. Yet many influencers proclaim you can obtain all the **nutrients** you need from **food**.

These assertions are often based on studies demonstrating benefits of **healthy diets**, such as a **2018** publication showing a **25% lower** risk of cardiovascular disease in women with the *greatest* adherence to a **Mediterranean diet**, compared to the *lowest* adherence.¹

A **2024** study published in the *Journal of the American Medical Association* corroborates this. It showed **23% reduced** all-cause **mortality** in a large group of women with the *highest* adherence to a **Mediterranean diet** over a multi-decade period.²

These data sets demonstrate the benefits of ingesting health-promoting foods as opposed to the **toxic** ones that dominate today's dietary patterns.

This has little relevance, however, to the scarcity of critical **nutrients** contained even in the best diets.

"As long as a person's diet falls within a wide range of what medical professionals consider balanced, it's unlikely they would benefit from any dietary supplement."³

David Seres, MD, ScM, PNS, is a professor in the Department of Medicine and Institute of Human Nutrition at Columbia University Vagelos College of Physicians and Surgeons.

When nutrition experts claim people can get their **nutrients** in a "balanced diet," they appear unaware of how little of these nutrients are contained in foods. They also seem to not fully realize how few Americans ingest the wide variety of nutrient-dense foods they espouse.

We at **Life Extension** long ago advocated healthy dietary practices but also warned of the strikingly low potencies of **nutrients** contained in foods.

This editorial quotes those who claim that **supplements** are unnecessary and reveals the inadequate **potencies** of nutrients derived from **foods**.

"As far as nutrition, we should get those [nutrients] by consuming 30 different types of plants per week.

It's better to get them from real food than from supplements and additives."⁴

Eric Schlosser, author of "Fast Food Nation: The Dark Side of the All-American Meal."

The media reports on studies showing the life-shortening impact of **ultra-processed** foods that now dominate the Standard American Diet (SAD).⁵

The data sets are consistent, with the most startling study showing that people with the *highest* intake of **ultra-processed** foods are **62% more** likely to **die** over a **15-year** period as compared to those with a low intake.⁶

The life-shortening culprits in **ultra-processed** foods include all kinds of artificial compounds and natural ones like sugars and salt.

Nutritional professionals point out that **ultra-processed** foods are low in essential nutrients such as fiber, vitamins, and minerals, leading to increased risk of **chronic diseases**.⁷ These experts state that people can mitigate these risks by eating a healthier, balanced diet.

The problem is that nutrient **potencies**, even in most healthy foods, do not add up to what many experts believe are needed.

“Supplements may offer some modest compensation for deficiencies of diet, but no supplement can do for the immune system what a balanced diet of wholesome foods can do.”⁸ Supplements are not a substitute for a good diet.”⁹

Dr. David Katz is the founding director of the Yale-Griffin Prevention Research Center and an expert in nutrition and preventive medicine.



Vitamin D

Vitamin D is the most widely recommended nutrient by physicians due to its multiple roles, including in protecting against **age-related** pathologies.

The minimal blood level of *25-hydroxyvitamin D* to achieve protective effects is **30 ng/mL**.¹⁰ Levels below **20 ng/mL** are considered deficient.

Many experts view **40 to 60 ng/mL** of *25-hydroxyvitamin D* as optimal ranges.¹¹ We at **Life Extension** believe **50-80 ng/mL** may confer the greatest benefits.

A randomized controlled trial published in **2022** showed that in people over age 70, supplementing with **2,000 IU/day** of **vitamin D** combined with an **omega-3** supplement and modest exercise reduced their risk of **invasive cancer** by **61%**.¹²

In a **2023** published meta-analysis of three randomized-controlled trials, people **supplementing** with vitamin D and maintaining a *25-hydroxyvitamin D* level of at least **50 ng/mL** reduced their absolute three-year risk for diabetes by **18.1%** compared to those who had *25-hydroxyvitamin D* levels between **20-29 ng/mL**.¹³

To achieve these *higher* beneficial ranges may require **2,000 to 8,000** International Units (IU) per day of **vitamin D**. The dose depends on body weight and individual absorption/utilization rates.

One of *highest* dietary sources is **sockeye salmon** which provides approximately **570 IU** of **vitamin D** per **3-ounce** serving.¹⁴

Other commonly consumed dietary sources of vitamin D have lower potencies as follows:¹⁵

- **SARDINES:** Approximately **164 IU** per 3-ounce serving
- **TUNA:** Approximately **231 IU** per 3-ounce serving
- **SOY MILK:** Approximately **119 IU** per cup
- **MILK:** Approximately **117 IU** per cup
- **FORTIFIED ORANGE JUICE:** Approximately **100 IU** per cup
- **EGGS:** Approximately **44 IU** per egg¹¹

If a person attempted to ingest even minimum amounts of vitamin D from **foods**, he or she would have to ingest **sockeye salmon** each day, plus lots of high-calorie/glucose-spiking foods and beverages, some of which are considered “processed.”

Low-cost **supplements** provide individualized **vitamin D** doses without unwanted calories. Yet, experts claim humans can get enough vitamin D from a “balanced diet,” which mathematically does not make sense.

“Unless there’s a medically identified deficiency, there’s no scientific evidence to show that supplements make healthy people healthier.”¹⁶

Marion Nestle is a professor of nutrition, food studies, and public health at New York University and a well-known author on food politics and health.

Difference Between Processed and Ultra-Processed

Processed foods are those that have been altered from their natural state for safety reasons or for convenience. This includes processes like milling, pasteurizing, cooking, and canning.^{24,25}

Ultra-processed foods go through multiple stages of processing and often contain additives such as preservatives, sweeteners, artificial colors, and flavors. They are typically ready-to-eat or ready-to-heat and have a long shelf life.^{24,25}

The public is increasingly warned to reduce their intake of **processed** and **ultra-processed** foods, yet these toxic food groups continue to be overconsumed.



Coenzyme Q10

Coenzyme Q10 (CoQ10) plays a crucial role in **mitochondrial energy** production, but CoQ10 levels decline with normal aging and/or statin drug use.¹⁷

Since its introduction to the United States in **1983**,¹⁸ CoQ10 **potencies** and **absorption** qualities have substantially increased. Aging individuals often take **100 mg** a day (and higher) of CoQ10 supplements that are formulated to deliver more CoQ10 to the bloodstream.

A clinical study showed that healthy people taking **100-150 mg** of **CoQ10** daily had reduced fatigue and improved **energy** levels.¹⁹

Clinical studies have also found that those with **heart failure** taking *higher* dosages had reduced their cardiac symptoms and lessened major vascular events.²⁰⁻²²

To obtain **113 mg** of regular CoQ10 in the diet, a person would have to ingest **2.2 pounds** of **beef heart** every day. Another way of obtaining around **100 mg/day** of CoQ10 is to eat around **4.4 pounds** of **beef liver**. Neither of these options makes sense to me.

Other **dietary** sources of **CoQ10** are:²³

- **BEEF MUSCLE:** Approximately **40.1 mg/kg*** (35 oz)
- **PORK MUSCLE:** Approximately **45 mg/kg** (35 oz)
- **SARDINES:** Approximately **64.3 mg/kg** (35 oz)
- **MACKEREL:** Approximately **67.7 mg/kg** (35 oz)
- **SPINACH:** Approximately **10.2 mg/kg** (22 cups)
- **BROCCOLI:** Approximately **8.6 mg/kg** (13 cups)
- **PEANUTS:** Approximately **26.7 mg/kg** (8 cups)
- **SOYBEAN OIL:** Approximately **279 mg/kg** (35 fl oz)

*Note a kilogram (kg) is **2.2 pounds** of food, which is a lot of **calories!**

I doubt anyone reading this article could come close to ingesting the **pounds of food** needed to obtain **100 mg of coenzyme Q10**.

Can anyone imagine drinking a **pound** of **soybean oil** to acquire **100 mg** of CoQ10? Soybean oil can be classified as “processed” or “ultra-processed,” depending on the extent of industrial processing it undergoes.

Yet, what has become a virtual cliché in the conventional world, **supplements** are not needed, and it is better to obtain vital nutrients via one’s **diet**.

Lutein and Zeaxanthin

Lutein and **zeaxanthin** are carotenoids that are important for maintaining vision. They may help reduce the risk of **macular degeneration** and cataracts.²⁶

The average American ingests **1-2 mg** of **lutein** a day. If the person eats lots of spinach, kale, and collard greens, daily lutein intake can increase to around **10 mg/day**, which may confer protective effects.²⁷

Zeaxanthin is contained in lutein-rich foods and different colored vegetables. The average American dietary intake of zeaxanthin is **1 to 3 mg**, which is close to what meaningful protective dietary levels may be.²⁸

In the instance of lutein and zeaxanthin, it is possible to obtain enough from dietary sources, provided one can ingest these vegetables virtually every day.

Published studies show that people who regularly consume spinach and collard greens have lower levels of age-related **macular degeneration**.^{29,30}

A meta-analysis of 46 different studies evaluated the effects of **lutein** and **zeaxanthin** from diet or supplements. The findings revealed that an intake of



less than **5 mg** per day **lutein** and **zeaxanthin** was not enough to improve a marker of macular health. However, increments of **5-20 mg** per day did result in significant improvements and even greater improvements were observed at a total daily intake of **20 mg** or more.³¹

Meso-Zeaxanthin

Meso-zeaxanthin is a carotenoid that makes up about one-third of our **macular density**.

Unlike lutein and zeaxanthin, **meso-zeaxanthin** is not typically present in most foods in significant amounts. Instead, it is primarily formed in the retina by the conversion of lutein.

With age, conversion of **meso-zeaxanthin** from lutein in the retina diminishes, which is why it is included in some eye health supplements that target macular health.

Those who rely on **diet** alone to maintain **macular density** may be deficient in the **meso-zeaxanthin** carotenoid.

"If we have a well-balanced diet consisting of lean proteins, whole grains, fruits and vegetables, then we should find that we don't necessarily need vitamins or have supplements on board."³²

Fatima Cody Stanford, MD, MPH, MPA, an obesity medicine physician-scientist at Massachusetts General Hospital and Harvard Medical School.

Vitamin K

The intake of **vitamin K** in the typical American diet is estimated to be around **90-120 mcg** per day. This is more than sufficient to enable healthy blood coagulation.³³

Vitamin K's other effects are maintaining **calcium** in **bone** and reducing **calcium infiltration** into arteries and heart valves.

These beneficial effects require *higher* vitamin K intake, along with intestinal conversion of vitamin **K1** from plants to the more active vitamin **K2** (found in natto, cheese, dairy, and meats).³⁴

A randomized-controlled trial found that for people with coronary artery **calcification** who were taking daily multivitamins, adding **500 mcg** of vitamin K1 daily led to a **6%** decrease in their three-year coronary disease progression compared to those taking only the multivitamin.³³



VITAMIN

K

Vitamin K2 is considered the most active form, and some K1 is converted to K2 in the body.³⁴

Vitamin K2 supplement doses start around **100 mcg/day** and increase to **45,000 mcg/day**.³³

Major sources of vitamin **K1** in the diet:¹¹

- **KALE:** Approximately **493 mcg** per cup, raw³⁴
- **SPINACH:** Approximately **121 mcg** per cup, raw³⁴
- **BROCCOLI:** Approximately **220 mcg** per cup, cooked³⁴
- **BRUSSELS SPROUTS:** Approximately **156 mcg** per cup, cooked³⁵
- **LETTUCE:** Approximately **44 mcg** per cup, raw³⁴
- **ASPARAGUS:** Approximately **45 mcg** per cup, cooked³⁵

Major sources of vitamin **K2** in the diet:³³

- **NATTO** (fermented soybeans): Approximately **1,000 mcg** per 100 grams
- **CHEESE:** Varies significantly; generally, around **8-10 mcg** per 100 grams



If one eats lots of healthy plant foods, they get plenty of vitamin **K1**. The question is how much K1 gets converted to **K2**.

Some vitamin K1 is converted to vitamin K2 in the body, but the efficiency of this process is limited. To ensure optimal amounts from dietary sources, it would be important to consume vitamin K1 from vegetables and vitamin K2 from fermented foods or animal products.³⁶

Fermented foods do not comprise a large part of American diets and health-conscious people often seek to reduce intake of animal products.

Vitamin K2 supplements provide an alternative/addition to dietary sources.

"For most people, they don't need multivitamins or supplements. If you have a well-balanced diet, you don't need a multivitamin or a supplement."³⁷

Dr. Matthew Silvis, vice chair of clinical operations for Penn State Health Family and Community Medicine and medical director of primary care sports medicine for Penn State Health.



Taurine

Taurine is a low-cost amino acid that may be one of the most important **anti-aging** interventions available today.

A major study published in the journal **Science** (June 2023) revealed:³⁸

- **Taurine** blood levels plummet in mice and people with age.
- The median **lifespan** of **taurine**-treated mice was **10%-12% longer** than controls. Life expectancy at **28 months** increased by **18%-25%**.
- Middle-aged mice receiving **taurine** had less body fat and more bone mass.
- **Taurine**-fed mice perform better in muscle strength, endurance, coordination, and insulin sensitivity.
- Blood levels of **taurine** are **80% lower** in elderly **humans** relative to **youth**.
- Lower taurine levels in **humans** were found to be associated with **age-related** problems.

Other studies^{39,40} show that older people need about **3,000 to 5,000 mg** per day of taurine to restore youthful levels, and to attempt to emulate the insights provided by the pro-longevity study published in **Science**.

The typical American diet, however, provides only **100-180 mg** of **taurine** each day, mostly from meat, eggs, dairy, and seafood.

Those who follow strict plant-based diets (vegetarians/vegans) only obtain about **17 mg** of taurine each day.⁴¹



In the case of **taurine**, it is not possible to safely obtain *high* doses from dietary sources.

Experts Should Do the Math!

It's hard for people to abstain from habitual clichés, even when the **math** proves the concept incorrect.

As it relates to the **quantities** of **nutrients** obtainable from **dietary sources**, they are often inadequate to meet even minimally recommended daily intake, let alone the **optimal** levels that published studies indicate help confer healthier **longevity**.

Until the low potencies of **nutrients** in foods become more widely understood, even otherwise credible influencers who advocate **disease-preventing** foods will continue to confuse consumers.

For longer life,

William Faloon, Co-Founder
Life Extension

"Cobern explained that, when possible, it's best to get vitamins and minerals from your diet, focusing on increasing vegetable intake and limiting red meat consumption, rather than relying solely on a supplement."⁴²

Dr. Jade A Cobern, MD, MPH, board-certified physician in pediatrics and general preventive medicine.

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In the News



Vitamin D Deficiency Associated with Greater Multiple Sclerosis Risk

A meta-analysis found an association between vitamin D deficiency and a greater risk of **multiple sclerosis** (MS).*

Researchers selected 14 case-control studies that compared the risk of MS between adults with deficient and non-deficient vitamin D levels.

Deficiency was defined in most studies as 25-hydroxyvitamin D levels under 20 ng/mL.

Pooled data from the studies showed those who were deficient in vitamin D had a risk of MS that was **54%** greater than in those who had sufficient levels.

Editor's Note: "It is justifiable to conclude that maintaining sufficient vitamin D levels may be an important modifiable factor in reducing the risk of MS," the authors stated.

* *Mult Scler Relat Disord*. 2024 Aug 8:90:105804.

Citicoline's Neuro-Protective Effects

A recent review described citicoline's mechanisms and clinical relevance in the treatment of neuroinflammatory disorders.*

Citicoline is produced naturally in the body in small amounts. It is used in the synthesis of phosphatidylcholine, a critical constituent of cell membranes, needed for neuronal function. Citicoline also helps inhibit proinflammatory molecules.

Researchers have evaluated citicoline in people with age-related memory impairment, head trauma, acute ischemic stroke, and glaucoma.

The authors of the review note that although the results are mixed, many studies have found that citicoline could improve neurological function, disability reduction, expedited recovery, and cognitive-decline prevention.

Editor's Note: "Citicoline stands as a promising agent, wielding both neuroprotective and anti-inflammatory potential across a spectrum of neurological conditions," the authors said.

* *FASEB J.* 2024 Sep 15;38(17):e70030.





Taurine Benefits the Heart

A systematic review and meta-analysis revealed the pooled heart-health benefits of the amino acid **taurine**.¹

The meta-analysis included 808 participants in 20 randomized, controlled trials that compared the effects of taurine to a placebo in people with coronary heart disease, history of coronary artery bypass, heart valve defects, congestive heart failure, cardiomyopathy, prehypertension, portal hypertension, or diabetes, or in generally healthy men.

Trial outcomes examined in the meta-analysis included heart rate, blood pressure, and left ventricular ejection fraction. Those who received taurine had the following significant improvements: **3.6 bpm** reduction in resting heart rate, **4 mmHg** reduction in systolic blood pressure, **1.4 mmHg** reduction in diastolic blood pressure, and **5%** increase in left ventricular ejection fraction.

In taurine-supplemented individuals there was also a significant improvement in New York Heart Association Functional Classification Scores, which is an assessment of heart failure status based on the severity of symptoms and limitations on physical activity.²

Editor's Note: "Taurine showed noteworthy effects in preventing hypertension and enhancing cardiac function. Individuals prone to cardiovascular disease may find it advantageous to include taurine in their daily regimen," the authors concluded.

1. *Nutr J.* 2024 Aug 15;23(1):93.

2. Available at: <https://www.heart.org/en/health-topics/heart-failure/what-is-heart-failure/classes-of-heart-failure>. Accessed December 5, 2024.

Reishi Mushroom Extract Enhances Immune Function

Reishi mushroom (*Ganoderma lucidum*) extract improved immune responses and reduced inflammation in older women, according to a study published in *The British Journal of Nutrition*.*

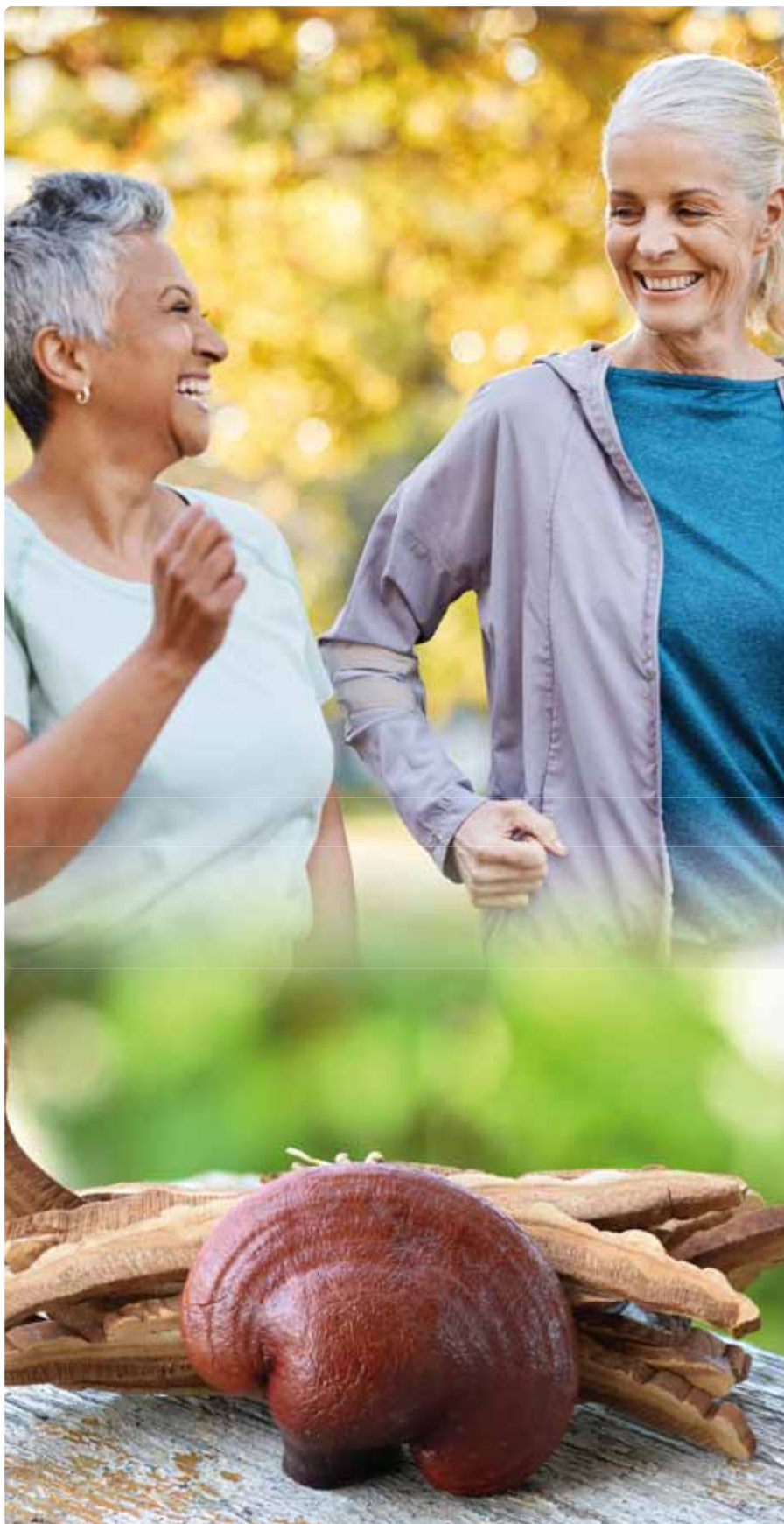
For this double-blind clinical trial, 39 women aged between 60–80 years took either **2,000 mg** of reishi extract or a placebo daily for eight weeks.

At the end of the study, participants had a class of immune cells called T-lymphocytes evaluated for functionality. Those who received the reishi extract had T-lymphocytes that produced more positive response to an inflammatory stimulus than the group that received the placebo.

These results indicate that supplementation with the reishi extract contributes to enhanced immune response and an anti-inflammatory response.

Editor's Note: "Ganoderma lucidum (a mushroom used in traditional Chinese medicine) compounds may attenuate aging-related physiological changes and restore normal immunity," the authors stated.

* *Br J Nutr.* 2024 May 27:1-11.



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1. *JAMA Ophthalmol.* 2015;133(12):1415-24.
2. *Nutrients.* 2013 April;5(4):1169-85.
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Plant-Based Solution for FOOD SENSITIVITY

BY ERIC HOLITZER

Food sensitivities or intolerances affect an estimated **20%** of the population.¹

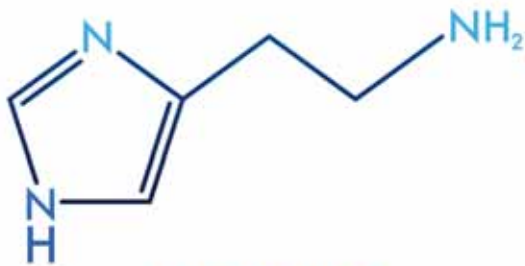
A frequently undiagnosed example is **histamine intolerance**.² Many people struggling with abdominal bloating and pain, diarrhea, gas, headaches, and other symptoms have no idea that foods containing **histamine** may be the cause.³

Avoiding dietary histamine is difficult. But there is another option for managing histamine intolerance.

In clinical studies, oral intake of the enzyme **diamine oxidase (DAO)** breaks down **histamine** in the digestive tract. This can significantly reduce or prevent symptoms caused by sensitivity or intolerance.⁴⁻⁹

Most commercially available **DAO** is derived from pigs.⁸

A new **plant-derived DAO** makes this relief available to a wider range of people with **histamine intolerance**, including vegans, vegetarians, and anyone who avoids consuming pork products.²



HISTAMINE



What Is Histamine Intolerance?

Histamine is a bioactive amine/neurotransmitter that regulates many physiological functions, including those in the brain, gut and immune system.

Histamine can be formed in the human body from the amino acid histidine, produced by bacteria in our microbiome. It's also ingested from many food products.

As part of its immune function, histamine stored by immune cells is released in response to foreign substances² such as pollen or animal dander.

This histamine acts like a trigger to turn on inflammation. The result is sneezing, itchy skin and eyes, and other symptoms associated with **allergic reactions**.²

That's why **antihistamine** medications are often used to minimize allergy symptoms.

However, **histamine intolerance** is *not* an allergy. In an allergic reaction, our *own* cells release histamine.²

In **histamine intolerance**, the histamine degradation system in the gut is unable to process **histamine** consumed in **foods**.

This accumulated histamine can cause **gastro-intestinal symptoms**, including nausea, bloating, abdominal pain, diarrhea, gas, or constipation. Body-wide symptoms like headache, dizziness, a feeling of brain fog, itchy skin or rash, hives, nasal congestion, and sneezing may also occur.²

In this situation, the proper function of **diamine oxidase (DAO)** is key in preventing **histamine** accumulation.² **DAO** is a histamine-degrading enzyme.



Histamine-Containing Foods

A histamine-free diet is virtually impossible because many foods and drinks contain histamine, with the largest amounts found in foods or drinks that have been **fermented, aged, or preserved**, including:²

- Cured or fermented meats, such as some dried sausages and deli meat,
- Canned, preserved, or smoked fish or shellfish,
- Aged cheeses, and
- Wine and beer.

Many other foods contain smaller amounts of histamine or histamine-like chemicals, including tomatoes, spinach, eggplant, nuts, legumes, bananas, pineapple, strawberries, and citrus fruits.

What Causes Histamine Intolerance?

The enzyme **diamine oxidase (DAO)** is the main **histamine-degrading enzyme** in the digestive tract, responsible for degrading histamine from foods. When our body produces enough **DAO**, histamine in food is metabolized before it causes problems.²

But **DAO** production and activity can be lower in some people. In these people with diminished ability to break down histamine, ingestion of histamine-rich foods can cause a wide array of symptoms known as histamine sensitivity or intolerance.

DAO to the Rescue

Avoiding foods high in histamine may help control symptoms in some people. But completely eliminating histamine from the diet is often impossible.

The good news is that there is another option: The enzyme **diamine oxidase** can be taken **orally** with food to help digest histamine. Human studies show that **DAO** intake can help reduce or prevent symptoms associated with **histamine intolerance**.⁴⁻⁹

One clinical study enrolled participants with **DAO** deficiency and frequent **migraine headaches**. Taking **DAO** three times a day before each meal significantly reduced the **number** and **duration** of headache



What You Need To Know

Help For Histamine Intolerance²

- Some people have a sensitivity to **histamine**, a bioactive amine contained in many different types of foods and drinks.
- In people with **histamine intolerance**, consuming histamine-rich foods can trigger gastrointestinal symptoms like abdominal pain and bloating, diarrhea, gas, and nausea, and/or systemic effects such as headaches, itchy skin, and brain fog.
- People who suffer from histamine intolerance may be deficient in an enzyme called **diamine oxidase (DAO)** that normally breaks down histamine in the gut, *preventing histamine accumulation, which may cause symptoms.*
- In these individuals, oral intake of **DAO** has been clinically shown to help prevent or reduce symptoms of histamine intolerance.
- Supplemental **DAO** is typically derived from pig kidneys, but a new plant-based **DAO** derived from **pea sprouts** allows a larger number of people to experience relief from histamine intolerance symptoms.

episodes and reduced the number of subjects needing to take pain medication.⁴

In another study, patients with signs of **histamine intolerance** and low DAO levels on blood tests were given **DAO** before meals for a month. This significantly reduced frequency *and* severity of gastrointestinal histamine-related symptoms such as **bloating, pain, diarrhea, and fullness.**⁸

During a follow-up period, when **DAO** was no longer taken, symptoms increased again.

These and other studies suggest that **DAO** intake can be an effective means of managing symptoms of **histamine intolerance.**

Plant-Derived DAO

The clinical studies cited so far have used DAO derived from pig kidney. However, a vegetarian-friendly novel **DAO** has been isolated from **pea sprouts.**

The **plant-derived DAO** has a capacity of breaking down **histamine** similar to its porcine counterpart.¹⁰

This **vegetarian** formulation allows those who avoid meat or pork-derived products to use **DAO** to help prevent symptoms of histamine intolerance.

Summary

One food sensitivity that often goes undiagnosed is **histamine intolerance**.

Histamine consumed in foods including wine, beer, canned and preserved fish, cured and fermented meats, and aged cheeses can cause gastrointestinal problems, headaches, and other symptoms.

Some people are prone to histamine intolerance because of a deficiency of an *enzyme* called **DAO** that breaks down histamine in the digestive tract.

Taken orally, a novel **plant-derived DAO** may help reduce or prevent symptoms of histamine intolerance. ■

Is It Histamine Intolerance or Another Cause?

Histamine intolerance is one of many conditions that can cause symptoms after consuming specific foods.¹¹

Others may include:

- True **food allergies**, which can be life-threatening, with **immediate allergic reaction** occurring soon after—within minutes—of ingesting the trigger foods,
- **Intolerances or sensitivities** to gluten, dairy, soy, and other **food components**, with symptoms typically occurring some hours after ingestion,
- **Celiac disease**, an autoimmune condition,
- **Tyramine sensitivity**, a reaction to an amino acid in foods due to use of MAO inhibitor drugs, and
- Disorders like **irritable bowel syndrome** or **inflammatory bowel disease**.

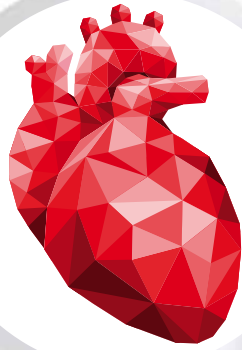
Distinguishing between these causes of food-triggered symptoms can be tricky. If you suspect you may have histamine intolerance or another one of these conditions, your physician can help evaluate that diagnosis.



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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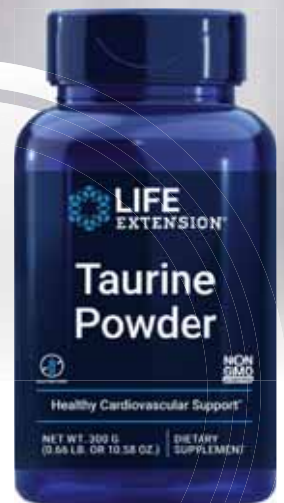
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		4+ units	—	\$23.40 ea.	18%
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02532	Creatine & Acetyl-L-Carnitine Energy Plus • 233 grams Power duo promotes cellular energy for mind and body.	1 unit	\$24.75	\$22.28	10%
		4+ units	—	\$19.80 ea.	20%
02531	Cardio Peak™ • 30 vegetarian capsules Supports healthy cardiac output: the heart's ability to pump blood as well as heart muscle strength, endurance and overall heart function.	1 unit	\$11.25	\$10.13	10%
		4+ units	—	\$9.00 ea.	20%

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02403	Lithium • 1000 mcg • 100 vegetarian capsules Low-cost mineral that functions in several ways to support overall brain health.	1 unit	\$12.00	\$10.80	10%
		4+ units	—	\$9.45 ea.	21%
01827	Taurine • 1000 mg • 90 vegetarian capsules Taurine capsules to support healthy aging.	1 unit	\$9.75	\$8.78	10%
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02107	Extend-Release Magnesium • 60 vegetarian capsules Immediate- and extend-release magnesium for sustained benefits.	1 unit	\$9.75	\$8.78	10%
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02334	Super K • 90 softgels • (3-month supply) Two forms of vitamin K2 (MK4 + MK7) and K1 to support bone/arterial health.	1 unit	\$22.50	\$20.25	10%
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02324	Advanced Curcumin Elite™ Turmeric Extract, Ginger & Turmerones • 30 softgels We've augmented our ultra-absorbable curcumin-fenugreek combo with complementary ginger and turmerone extracts.	1 unit	\$21.00	\$18.90	10%
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02501	Vitamin C 24-Hour Liposomal Hydrogel™ Formula 60 vegetarian tablets Absorbs better than standard vitamin C, staying in your system up to 24 hours!	1 unit	\$25.50	\$22.95	10%
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		4+ units	—	\$26.10 ea.	19%
01727	Bone Restore Calcium Supplement with Vitamin K2 120 capsules Nutrients to maintain skeletal strength in one highly absorbable formula.	1 unit	\$18.00	\$16.20	10%
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01988	Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin • 120 softgels Heart & brain health, inflammation health support, advanced formula.	1 unit	\$40.50	\$36.45	10%
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02301	Senolytic Activator® • 36 vegetarian capsules (3-month supply) Highly <i>absorbable</i> forms of fisetin, quercetin, plus apigenin and theaflavins designed to help manage senescent cells.	1 unit	\$19.50	\$17.55	10%
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01208	Super R-Lipoic Acid • 240 mg • 60 vegetarian capsules Superior efficacy with stabilized R-lipoic acid.	1 unit	\$36.00	\$32.40	10%
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00335	DHEA • 25 mg • 100 capsules Promotes optimal hormone balance and overall health.	1 unit	\$11.25	\$10.13	10%
		4+ units	—	\$9.23 ea.	18%
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Food Sensitivity Relief provides plant-based diamine oxidase.

Human studies showed that supplementation with diamine oxidase before meals may help provide occasional digestive relief due to histamine food sensitivity.²⁻⁴

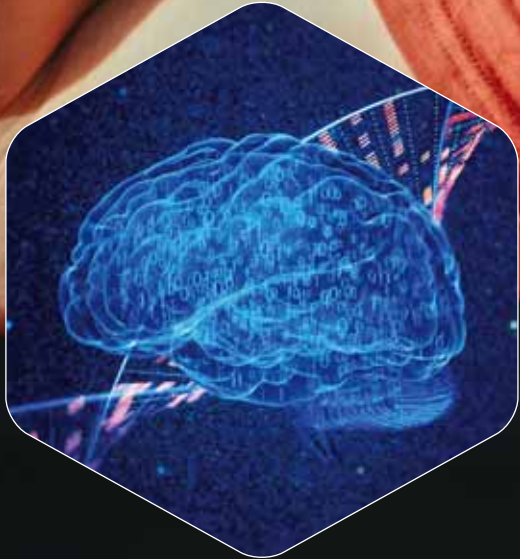
Take one capsule before the heaviest meals, up to three times daily.

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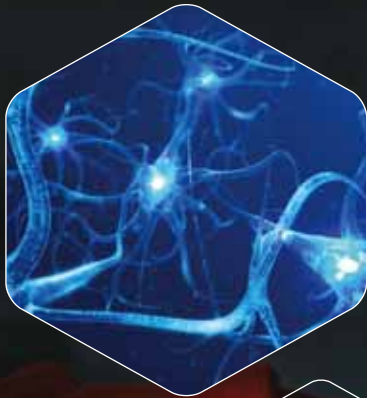
CAUTION: This product breaks down histamine but won't prevent severe allergic or gluten-related (celiac) reactions. Do not knowingly ingest food you are allergic to.
1. *Biomolecules*. 2020 Aug 14;10(8):1181. 2. *Clin Nutr*. 2019 Feb;38(1):152-8. 3. *Food Sci Biotechnol*. 2019 Dec;28(6):1779-84. 4. *J Clin Med*. 2023;12(20).

Boost PHYSICAL and Mental ENERGY





BY MICHAEL DOWNEY



Two amino acid-derived compounds support energy-generating functions in the body.

Creatine is found naturally in muscle, brain, and other cells that have high-energy demand.

It forms a compound inside cells that provides the power required to ‘recycle’ **adenosine triphosphate (ATP)**.

ATP powers vital cellular functions.¹

Carnitine facilitates transport of fatty acids inside mitochondria to produce more **ATP**.^{2,3}

Our bodies can produce both amino acid-derived compounds, but we also rely on the diet (up to **50%** of the body’s need for **creatine** is from diet)—mostly animal products.^{2,4}

Low dietary intake of amino acids and their decreased synthesis in the elderly is associated with decreased muscle mass.⁵

Creatine^{6,7} and carnitine⁸ content in muscle is lower in vegetarians and the **elderly**.

And what is fascinating about this article is that it describes clinical studies showing benefits in **100-year-old** humans.

Aging is associated with reduction in muscle mass, increase in intramuscular fat, frailty, and fatigue. But there's a partial solution to this problem.

In clinical studies:

- **Creatine** intake demonstrated ergogenic benefits,⁹⁻¹¹ improved muscle mass,¹² and reduced fat mass,¹³ while enhancing exercise performance^{9-11,14} in various age groups and levels of training. In one clinical trial of women around 65 years old, daily creatine intake resulted in boosting training volume by **164%**.¹⁴
- **Carnitine** intake boosted mental and physical **energy** levels, reduced mental and physical **fatigue**,^{15,16} enhanced cognitive and neurological function,¹⁷⁻¹⁹ and improved frailty scores.^{15,16}

Together, these compounds may help maintain **body composition** and **mental and physical energy** levels well into older age.



Creatine Supports Physical Performance

Because creatine helps recycle the ATP pool, it is especially important during high-energy demand activities such as high-intensity training.²⁰⁻²² For this reason, **creatine** has long been used by athletes to boost performance and build **muscle strength**.²¹

Furthermore, clinical studies have shown creatine has similar benefits in older, non-athletes as well.¹⁰

A review published by the International Society of Sports Nutrition stated that creatine improves the performance of **high-intensity** tasks like weight training, running, and swimming by **10%-20%** in athletes and active younger and older adults.¹⁰

A meta-analysis showed that in healthy **older adults**, creatine protected against age-related **muscle loss**, leading to increases in lean tissue mass and upper and lower body strength.¹¹

In one clinical study, men and women **60-80 years old** took either **5,000 mg of creatine monohydrate** (the most-studied form of oral creatine) or a **placebo** daily.

After **12 weeks** that included resistance training, those taking creatine had significantly reduced **fat** mass and increased **muscle** mass compared to the **placebo** group.¹²

In another study, healthy women with an average age of about **65 years** were given **5,000 mg of creatine monohydrate** or a placebo daily. After **12 weeks** that included resistance training, the creatine group had, compared to **placebo**:¹⁴

- **164%** greater **training volume** (the amount of work done in a workout in a given time),
- **5.1%** increased **bench press** capacity,
- **8.8%** improved **biceps curl** performance, and
- Almost **4%** greater **knee extension** performance.

A similar trial involved men and women with an average age of about **70 years**, who took either **5,000 mg of creatine monohydrate** or a placebo daily for 14 weeks.¹³

Compared to individuals who received the **placebo**, those in the **creatine** group had:¹³

- Increased **lean tissue mass**, and
- Greater isometric **knee extension strength**.



What You
Need
To Know

Mental, Physical, and Cognitive Effects of Carnitine

Carnitine supports whole-body energy and cognitive function. One clinical study looked at subjects **100 years** of age or older who felt **fatigue** after even slight physical activity. Those who took **2,000 mg** of **L-carnitine** daily for six months had, compared to a **placebo**.²³

- Reduced **physical fatigue**,
- Decreased **mental fatigue**,
- Lower **fatigue severity**,
- Decreased total **fat mass**, and
- Greater total **muscle mass**.

In another clinical trial, older adults considered **pre-frail** (at high risk of frailty) were given either a placebo or **1,500 mg** of **L-carnitine** daily for 10 weeks.¹⁶

Among the treatment group, **42.3%** felt **more energetic**, compared to **16.7%** of the placebo group. The carnitine group also had improved mean scores on the **Frailty Index** and improved **hand grip** test scores.¹⁶

Fight Fatigue with Creatine and Carnitine

- **Adenosine triphosphate (ATP)** is the source of energy for use and storage at the cellular level.
- **Creatine** and **carnitine** have ergogenic benefits by supporting ATP recycling and ATP synthesis, respectively.
- Lower levels of creatine and carnitine are associated with aging, frailty and reduced energy.
- In clinical trials, **creatine** improved muscle mass, reduced fat mass, and enhanced several aspects of exercise performance.
- In other clinical studies, **carnitine** boosted energy, reduced mental and physical fatigue, and improved cognitive function and body composition.

Improvement in cognitive function with carnitine was also shown in healthy **centenarians**, as demonstrated by a significant increase in Mini-Mental State Exam scores compared with placebo,²³ as well as in patients with mild cognitive impairment or Alzheimer’s Disease:

- In adults 65 and older with mild mental impairment, taking **2,000 mg** daily of **acetyl-L-carnitine (ALC)**, a form of carnitine that crosses the blood-brain barrier, for three months **improved cognitive function**, including measures of memory and attention.²⁴
- A review of clinical studies showed that the same dose, taken for **one year**, may delay the cognitive decline of patients with **Alzheimer’s disease**.²⁵

How Acetyl-L-Carnitine and Creatine Work

ATP (adenosine triphosphate) is the main carrier of **energy** in the body. The majority of ATP synthesis occurs within mitochondria.²⁶

Acetyl-L-Carnitine facilitates transport of long-chain fatty acids into the mitochondria, where they are broken down to help generate **ATP**.²

Creatine helps form a high-energy compound in cells that provides energy used to **resynthesize ATP**.¹

When energy demands are high (when muscles need a rush of energy or during times of fatigue, for example), it’s faster to resynthesize degraded ATP than to synthesize new ATP.^{27,28}

A combination of **carnitine** and **creatine** may help improve **physical** and **mental performance** and promote healthy aging by improving energy levels, body composition, and cognitive function.

Summary

In clinical trials, **creatine** intake increased muscle mass, reduced fat, boosted training volume, and enhanced exercise performance.

L-Carnitine boosted energy levels and reduced mental and physical fatigue, improved frailty scores, and enhanced cognitive function.

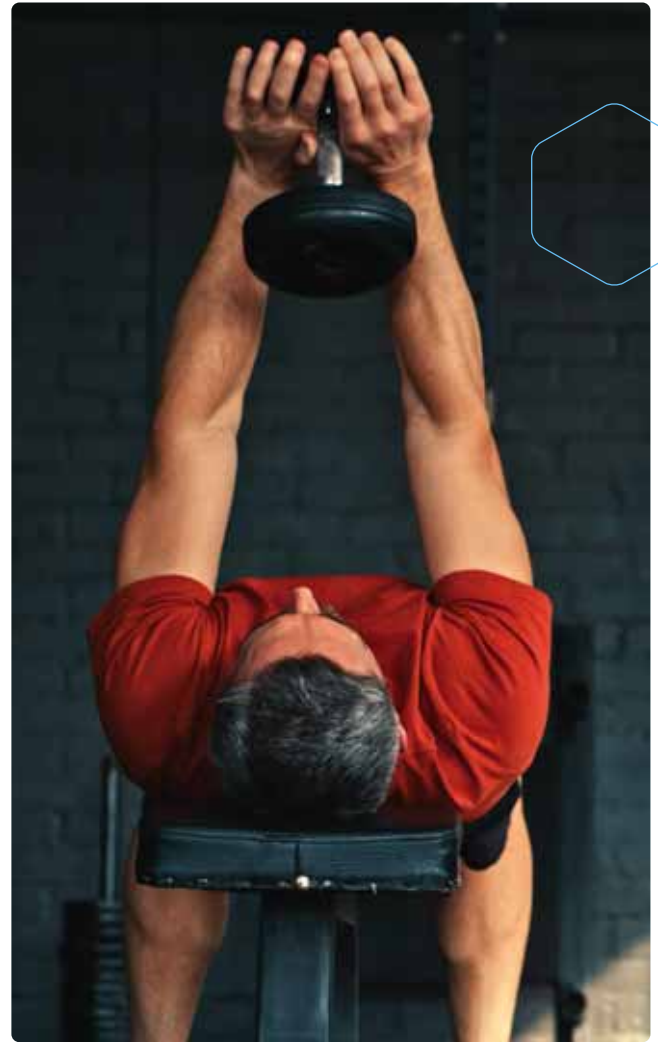
Taken together, **creatine** and **carnitine** may help maintain cellular **energy** levels and **reduce fatigue**. ■

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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Vitamins D and K as well as Iodine perform multiple functions for heart and bone health.

Life Extension brings these three nutrients together in one convenient capsule.



**VITAMIN D + VITAMIN K
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Convenience + Cost Savings**

Just one capsule daily provides:

Vitamin D3	125 mcg (5,000 IU)
Vitamin K1	1,000 mcg
Vitamin K2 (MK4)	1,000 mcg
Vitamin K2 (MK7)	100 mcg
Iodine	1,000 mcg

CAUTION: Individuals consuming more than 50 mcg 2,000 IU/day of vitamin D (from diet and supplements) should periodically obtain a serum 25-hydroxy vitamin D measurement. Do not exceed 250 mcg per day unless recommended by your doctor. Vitamin D supplementation is not recommended for individuals with high blood calcium levels. If you have a thyroid condition or are taking antithyroid medications, do not use without consulting your healthcare practitioner. If you are taking a vitamin K antagonist (e.g. warfarin), consult your healthcare practitioner before taking this product.

SUPER SALE PRICE
Item #02040
 60 capsules

1 bottle **\$16.20**
 4 bottles \$14.85 each



For full product description and to order **Vitamins D and K with Sea-Iodine™**, call 1-800-544-4440 or visit www.LifeExtension.com

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Two-Per-Day Multivitamin

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120 capsules

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4+ units \$15.30 ea.
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30 vegetarian tablets

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4+ units \$21.60 ea.
Save 24%

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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MORE
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MORE** 



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600 mg • 60 capsules

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Save 20%

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Crunch Digest Your Lunch

(Or breakfast, or dinner...)



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and I will continue with it."

Eric

VERIFIED CUSTOMER REVIEW

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

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

* *Curr Drug Metab.* 2016;17(2):187-93.

Contains wheat, soybeans.

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Item #02021 • 60 vegetarian capsules

1 bottle **\$14.85** • 2 bottles \$14.18 each



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Enhanced Super Digestive Enzymes, call

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Creatine & Acetyl-L-Carnitine Energy Plus promotes healthy energy production and supports exercise performance and cognitive function.

Clinical studies show that:

- **5 grams of creatine** increase both workout capacity and lean tissue mass*^{1,2}
- **2 grams of acetyl-L-carnitine** support physical *and* mental energy, as well as cognitive function³

Each scoop of **Creatine & Acetyl-L-Carnitine Energy Plus** provides **5 grams of creatine** and **2 grams of acetyl-L-carnitine**. This unflavored powder has no added sugars. It can be mixed easily into a smoothie, shake, juice, or water.

SUPER SALE PRICE

Item #02532

Net Wt. 233 g (0.51 pounds)

1 jar **\$22.28**

4 jars \$19.80 each



Brains & Brawn

For full product description and to order **Creatine & Acetyl-L-Carnitine Energy Plus**, call **1-800-544-4440** or visit **www.LifeExtension.com**

* when combined with a regular resistance training/exercise program.

References:

1. *J Int Soc Sports Nutr.* 2017;14(1):18.

2. *Open Access J Sports Med.* 2017;8:213-226.

3. *Curr Opin Gastroenterol.* 2023;39(2) 125-128.

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.



BY CHRISTINE RICHARDSON, PHD

Protect Your LUNGS and Breathe Easy

As we age, our **lung function** tends to decline by **1% to 2% every year**.^{1,2}

This decrease in lung health is made even worse by exposure to **air pollution** and **toxins**.^{3,4}

Scientists have discovered compounds that help maintain **lung health**, protect against damage, and boost respiratory function.

In a clinical study, one plant extract blend improved a measure of **lung capacity** by **30%** in healthy adults.⁵

In adults with **asthma**, a different botanical extract led to **50%** less waking at night from asthma-related symptoms and a **40%** decrease in the need to use a rescue inhaler.⁶



Lung Health Matters

People with **healthy lungs** tend to lead longer, healthier lives.⁷

But keeping the lungs functioning optimally isn't easy. After around age **35**, our respiratory muscles weaken, lung tissues lose their elasticity, and lung function begins to **decline**.^{2,3}

Making matters worse, approximately **40%** of Americans live in areas with poor air quality.⁸ Exposure to air pollution further damages lung health and can increase risk for lung diseases, including:^{7,9,10}

- Asthma,
- Chronic obstructive pulmonary disease (COPD),
- Bronchitis,
- Lung infections,
- Lung cancer, and
- Emphysema.

Here's the good news: Researchers have discovered specific plant-derived extracts and compounds that can help **protect the lungs**, improve breathing, and prevent further decline in lung function.



Boswellia-Bael Fruit Blend

Boswellia serrata is a tree native to India and parts of Asia. It has been used for centuries in traditional Indian medicine to treat a number of conditions, including **asthma**.^{11,12}

The **bael fruit** is also native to India and southeast Asia and has also been used in Ayurvedic medicine for many different ailments. It is known for supporting **respiratory** and **immune function**.^{5,12,13}

Researchers have combined extracts of **Boswellia** and **bael fruit** and tested their ability to improve lung function in human trials.⁵

In one **clinical trial**, healthy adults who reported a sensitivity to **air pollution** took either **200 mg** of **Boswellia-bael fruit extract blend** or a placebo daily. After six weeks, those who received the extracts showed improvements in pulmonary health, including a:⁵

- **30.2%** increase in total air exhaled during a spirometry test, which measures **lung capacity** (how much air you can breathe in or out of your lungs),
- **7.4%** improvement in **exercise capacity**, measured by average speed walked during a six-minute period, and a
- **16.4%** improvement in **forced air exhalation** in one second, a measure of how well air flows through the airways.

In another **clinical trial**, subjects with mild to moderate **asthma** took either **100 mg** of the **Boswellia-bael extract blend** twice daily or a placebo. The group that received the extracts showed a:¹⁴

- **50.2%** improvement in **peak expiratory air flow rate** (the maximum amount of air pushed out of the lungs when exhaling forcefully) after eight weeks, and a
- **44%** decrease in the use of **asthma inhalers** after just four weeks.

The scientists who conducted the study believe these improvements were due to the anti-inflammatory activity of the extracts.





What You
Need
To Know

Saffron Extract

Saffron is a spice that has long been used in traditional medicine to treat inflammation and **respiratory conditions**.⁶

Preclinical studies show that saffron relaxes the smooth muscles of the **trachea** (windpipe), which improves airflow and the ability to breathe.¹⁵⁻¹⁷

Clinical studies have shown that saffron can alleviate symptoms of **asthma** and improve pulmonary function tests in individuals with **COPD**.^{6,18,19}

In a clinical trial in adult subjects with mild to moderate **asthma**, participants received either **50 mg of saffron extract** or a placebo twice daily for eight weeks.^{6,18}

Compared to **baseline**, by the end of the trial, those who took **saffron** had:

- **50%** less waking at night due to asthma-related symptoms,
- Fewer episodes of shortness of breath during sleep,
- A **40%** decrease in the use of their asthma rescue inhaler, and
- Less physical activity limitation.

Saffron also reduced C-reactive protein (biomarker of inflammation).⁶

Improve Lung Function

- **Lung function** tends to decline by **1%-2%** every year after age 35. Exposure to pollution makes the problem even worse, increasing the risk for asthma and other lung diseases.
- In clinical studies, a blend of **Boswellia resin** and **bael fruit** extracts improved a measure of lung capacity by **30%** in healthy adults and led to a **44%** decrease in the use of asthma inhalers by adults with asthma.
- In another study of people with asthma, **saffron extract** decreased the need for a rescue inhaler, reduced limits on physical activity, and eliminated nighttime waking due to asthma symptoms.
- In preclinical studies, the compound **andrographolide** protected the lungs from oxidative stress and inflammation caused by pollution.
- A combination of the Boswellia-bael fruit blend, saffron, and andrographolide may provide strong support for healthy lungs and protection against damage caused by aging and poor air quality.

Andrographolide

Andrographolide is a compound extracted from the leaves of the plant *Andrographis paniculata*, which is used in traditional Indian medicine to support **immune function**.²⁰

Studies in cell and animal models show that andrographolide can protect the **lungs** against toxins found in pollution and smoke by:²¹⁻²⁴

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

A **combination** of the *Boswellia*-bael fruit blend, saffron extract, and andrographolide may help maximize support for healthy lung function, promote easier breathing, and protect the airways against pollution and age-related decline.

Summary

As we age, our **lung function** declines. Inhaling pollutants and toxins further damages the lungs and increases the risk of asthma, COPD, and other conditions.

Clinical studies show that a **Boswellia-bael fruit** extract blend and **saffron** extract can help improve lung function and breathing capacity while decreasing symptoms related to lung disease.

In preclinical studies, **andrographolide** has been shown to help defend lung tissue against the damaging effects of pollution.

Taken together, these extracts and compounds may help preserve lung function well into older age, improving breathing capacity and promoting healthy aging. ■

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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ZINC

UP

YOUR IMMUNE HEALTH

"It gives my immune system an extra kick when needed."

Tina

VERIFIED CUSTOMER REVIEW



SUPER SALE PRICE

Item #01813

50 mg • 90 vegetarian capsules

1 bottle **\$6.08** • 4 bottles \$5.40 each



OptiZinc® is a Lonza trademark, registered in the USA.

You know zinc is good for you—but are you getting enough?

Zinc promotes critical **immune** functions and healthy **bones**.

This formula provides **50 mg** of zinc in a convenient, vegetarian capsule.

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

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

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.

"I feel like I will be healthy
for the long haul."

Wendy

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Clean

Your House at the Cellular Level

Normal aging results in a buildup
of **senescent cells**.

Senolytic Activator® provides
four ingredients, including a
bio-available dose of **Bio-Fisetin®**,
to support healthy aging.

The suggested dose is three
capsules just **ONE** time each week.



SUPER SALE PRICE

Item #02301 • 36 vegetarian capsules

1 bottle \$17.55 • 4 bottles \$16.20 each

(Each bottle lasts for 3 months)



For full product description or to order
Senolytic Activator®, call 1-800-544-4440
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“Terrific.”

Christina

VERIFIED CUSTOMER
REVIEW

Defend Your Health



SUPER SALE PRICE

Item #01713

125 mcg (5000 IU) • 60 softgels

1 bottle **\$6.75** • 4 bottles \$5.85 each

Vitamin D3 Systemic support for immune function, bone health, and whole-body health.

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.



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

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"Great product,
works well."

Lloyd
VERIFIED CUSTOMER
REVIEW

Share a Longer Life



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

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

SUPER SALE PRICE

Item #01778 • 100 vegetarian capsules

1 bottle **\$9.45** • 4 bottles \$8.10 each

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

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

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BREATHE EASY

Lung health is adversely impacted by aging and environmental exposures.

Healthy Lungs contains plant-derived compounds to support **optimal lung** function:¹

- **Boswellia serrata**^{1,2}
- **Bael fruit**^{1,2}
- **Saffron**^{3,4}

Studies have shown these nutrients can:

- Encourage easy, open airways.^{1,2,4}
- Assist healthy adults sensitive to environmental exposure.¹
- Promote lung function.²⁻⁴

For full product description and to order **Healthy Lungs**, call **1-800-544-4440** or visit **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.
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AlvioLife® is a registered trademark of PLT Health Solutions-Laila Nutraceuticals LLC.

SUPER SALE PRICE

Item #02512

30 vegetarian capsules

1 bottle \$21.60

4 bottles \$19.80 each

(One capsule per day)



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Get More Out Of Life

Wishing for healthy aging? Start by protecting every cell in your body

Resveratrol is a legendary nutrient that's good for your heart, mind, and cellular health.

Optimized Resveratrol Elite™ contains *trans*-resveratrol in a hydrogel coating—acting as a sort of “genie in a bottle”—to improve bioavailability to cells throughout your body.

SUPER SALE PRICE

Item #02230

60 vegetarian capsules

1 bottle \$22.95

4 bottles \$19.80 each



GLUTEN
FREE

NON
GMO
LE CERTIFIED

VEGETARIAN
LE CERTIFIED

“I love this product!”

Susan

VERIFIED CUSTOMER
REVIEW

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

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Add AMPK

To Your Health Routine

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

Over time, AMPK levels decline and can cause accumulation of **abdominal fat**.

AMPK Metabolic Activator provides gynostemma and hesperidin extracts to:

- Revitalize youthful AMPK activity
- Encourage use of abdominal fat for energy
- Promote healthy cellular metabolism

SUPER SALE PRICE

Item #02207

30 vegetarian tablets

1 bottle **\$25.65**

4 bottles \$21.60 each



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



Actiponin® is a trademark of TG Biotech Co., Ltd.

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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Reduce Joint Pain with **ENHANCED KRILL OIL**

BY MICHAEL DOWNEY

A startling **70%** of adults over age 50 suffer from some degree of **joint pain**.¹

It can manifest as **osteoarthritis**¹ or other degenerative conditions that lower quality of life.^{1,2}

Human and laboratory research findings have demonstrated **joint benefits** using a **krill oil**-based nutrient combination.

In two separate **clinical trials**, this **krill oil** nutrient combination:

- Produced a mean **reduction** in a measure of joint pain of **49%** compared to **placebo** in 12 weeks in one study, and^{3,4}
- Enabled **68%** of subjects to report they were **completely pain-free** by the end of an eight-week study.⁵



Many with chronic **joint pain** turn to over-the-counter pain medications.¹ These drugs can provide effective temporary relief but have side-effect risks when used continuously.^{6,7}

Nutrient formulas, on the other hand, often have side benefits.

What's Behind Joint Pain?

Osteoarthritis is a degenerative joint condition that causes pain and stiffness in joints.⁸ This is the most common form of arthritis and can affect knees, shoulders, hips, fingers, and other joints.²

Sufferers may experience **joint pain**, decreased mobility and range of motion,⁹ lower quality of life, and reduced **muscle strength** near the joints.⁸

The primary driver of osteoarthritic joint breakdown is a combination of age-related wear and tear that gradually progresses over time, and chronic inflammation, leading to chronic pain.²

Conventional pain medication may provide some relief. But long-term use of these drugs can lead to gastrointestinal issues,¹⁰ and tolerance,¹⁰ and can also cause **kidney damage**.^{6,10,11}

In preclinical¹²⁻¹⁴ and clinical studies,^{12,15} researchers searching for safer alternatives found that oil from small shrimp-like organisms called **krill** may help treat arthritic joint tissue by neutralizing pro-inflammatory activity and protecting joint cartilage from damage.

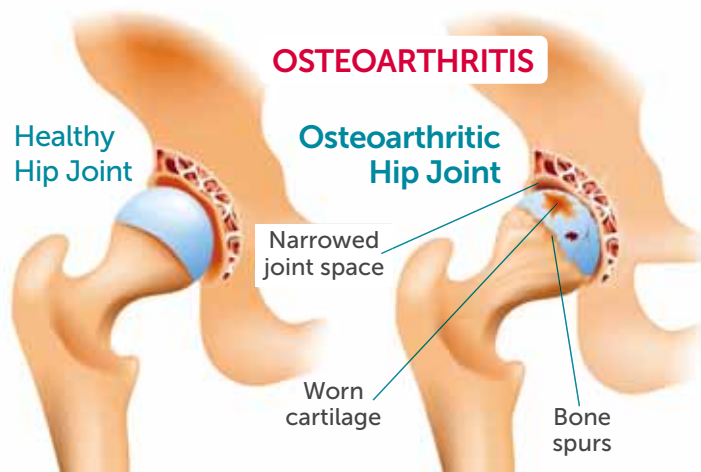
Further research led to a formulation that combines **krill oil** with two additional ingredients that augment its clinical effectiveness in treating joint pain.

Triple Support for Joints

The formulation combines the following **three** ingredients:

- Krill oil,
- Astaxanthin, and
- Hyaluronic acid.

Krill oil is rich in **omega-3 fatty acids EPA** and **DHA**. It also contains astaxanthin and flavonoids, all shown to exert potent **anti-inflammatory** effects.^{12,13} Clinical evidence shows that krill oil decreases systemic inflammation¹² and arthritic symptoms.¹⁵



Astaxanthin is a carotenoid found in some marine algae and animals, including krill. In human studies it has been shown to provide antioxidant support.¹⁶ Its **cartilage-protecting** effects have been shown in preclinical osteoarthritis models.^{17,18}

Hyaluronic acid, a polysaccharide that retains moisture, is found in many parts of the human body, including the **synovial fluid** of joints. Hyaluronic acid *suppresses* pro-inflammatory cytokines (signaling proteins) and *promotes* anti-inflammatory cytokines.^{9,19,20} It also plays a critical role in **lubrication**, tissue repair, and joint cartilage maintenance.^{9,19,21,22}

Preclinical Studies

Researchers developed a **blend** of all three ingredients to maximize the benefits for **joint health**.

In a study of mice with induced **arthritis**, this patented blend reduced levels of **pro-inflammatory** cytokines and increased levels of an **anti-inflammatory** cytokine in knee joint tissue.²³

In a rat model of **osteoarthritis**, the blend:²⁴

- Reduced **joint pain**,
- Suppressed joint **cartilage damage**,
- Reduced **pro-inflammatory cytokines**, and
- Decreased **biomarkers of the death of cartilage** cells.

Based on such impressive results, scientists conducted **clinical trials** to validate these findings in **humans**.

Remarkable Pain Relief

Researchers divided a group of 140 people with **joint pain** into three groups, 107 of whom completed the eight-week study and were included in the final analysis. Participants took capsules of either the krill oil blend, a placebo, or a glucosamine-chondroitin combination tablet.⁵

Joint pain was measured on **days 14, 28, and 56**. Using a standard **WOMAC** score (a 24-question assessment of pain, stiffness, and physical limitations), those who took the **krill oil, astaxanthin, and hyaluronic acid** blend had:⁵

- A progressive decrease in **pain severity** on *each* testing day,
- **Pain-free** status in **25%** of patients by **day 14**, and
- **Pain-free** status in **63%** of patients by **day 56**.

By **day 56**, *controlling for the effect of placebo*, the blend achieved a **55%** reduction in **WOMAC** pain scores, outperforming the **35%** reduction achieved by the **glucosamine-chondroitin** treatment.⁵

Another measure of joint pain, the patient-reported **Visual Analogue Scale (VAS)**, showed:⁵

- Progressive decrease in **pain severity** on *each* testing day, and
- **Pain-free** status in an astonishing **68%** of patients by **day 56**.

Further Clinical Validation

Results from an additional study, this time enlisting 100 Korean patients diagnosed with **mild degenerative osteoarthritis** in the knee or hip—75 of whom completed the study—were published around the same time as the previous study.^{3,4}

For this trial, patients took either the krill oil blend capsules or a matching placebo.

After 12 weeks, the **krill oil** group had an improvement in:^{3,4}

- Physical function score, according to the WOMAC scale, and
- Pain, according to the VAS scale.

These clinical studies suggest that the blend of **krill oil, astaxanthin, and hyaluronic acid** is well-tolerated, and this combination may support joint health.



What You
Need
To Know

Improve Joint Pain and Mobility

- Millions of adults suffer from **joint pain**, which can make daily activities difficult to perform.
- Most **pain medications** fail to treat underlying causes and can lead to other health problems, including kidney damage.
- **Krill oil, astaxanthin, and hyaluronic acid** were combined into a blend that delivers the anti-inflammatory and antioxidant effects needed to inhibit joint damage and reduce pain.
- In one human study, this blend resulted in **complete relief** from joint pain for **68%** of sufferers within just 56 days.

Summary

Joint pain limits physical activity and substantially reduces quality of life.

Scientists combined **krill oil**, **astaxanthin**, and **hyaluronic acid** to deliver optimum antioxidant and anti-inflammatory effects to painful joints.

In one clinical trial, patients' joint pain was reduced by an average of **49%**. In another trial, an impressive **68%** of participants reported being **completely pain-free** within **56 days**.

It's important to note that these results occurred over 8 to 12-week periods. In other words, these nutrients do not function as instant **pain-relieving** drugs.

Instead, they enable beneficial structure and function adjustments that address many underlying causes of joint discomfort and immobility. ■

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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Vitamin B1 (thiamine HCl)	75 mg
Vitamin B2 (riboflavin, riboflavin 5'-phosphate)	50 mg
Vitamin B3 (niacinamide, niacinamide ascorbate)	50 mg NE[•]
Vitamin B5 (D-calcium pantothenate)	50 mg
Vitamin B6 (pyridoxine HCl, pyridoxal 5'-phosphate)	75 mg
Folate (5-MTHF)	680 mcg DFE[°]
Vitamin B12 (methylcobalamin)	300 mcg
Biotin	300 mcg
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Manganese (manganese citrate, gluconate)	2 mg
Chromium [Crominex [®] 3+ chromium stabilized with Capros [®] amla extract (fruit), PrimaVie [®] Shilajit]	200 mcg
Molybdenum (amino acid chelate)	100 mcg
Inositol	50 mg
Alpha lipoic acid	25 mg
Bio-Quercetin[®] Proprietary Blend providing 35% quercetin (5 mg) [from Japanese sophora concentrate (flower bud)], 30% galactomannans (4 mg) [from fenugreek (seed)]	14 mg
Marigold extract [std. to 5 mg <i>trans</i> -lutein, 155 mcg <i>trans</i> -zeaxanthin]	11.12 mg
Apigenin	5 mg
Boron (boron amino acid chelate)	3 mg
Lycopene [LycoBeads [®] natural tomato extract (fruit)]	1 mg
Selenium [as sodium selenite, SelenoExcell [®] high selenium yeast, Se-methyl L-selenocysteine]	200 mcg

[^] RAE (retinol activity equivalents). [°] DFE (dietary folate equivalents). [•] NE (niacin equivalents).

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Dangers of Ultra-Processed Foods



DR. FLORENCIA ZIEMKE



Consuming higher amounts of **ultra-processed foods** has been connected to a range of health problems. These include higher cardiovascular mortality, type II diabetes, mental disorders, sleep problems, respiratory issues, obesity, and more.¹

These damaging foods are now estimated to make up **60%** of adults' diets,² and almost **70%** of the diets of children and teens.³

Dr. Florencia Ziemke is the founder and medical director of Evexia Medical, a nutrition and weight management practice in Palm Beach, Florida.⁴

Here, Dr. Ziemke explains exactly what **ultra-processed foods** are and why they are so detrimental to our health.

She also shares important tips on how to successfully reduce your intake of ultra-processed foods.

LE: What are ultra-processed foods (UPFs)?

Dr. Ziemke: A processed food is one that undergoes changes to its natural form.

Ultra-processed food is a whole different category. These foods have undergone extensive processing and contain little to no whole foods. Instead, they contain high levels of sugar, unhealthy fats, and salt, plus additives like coloring, emulsifiers, and flavoring.⁵

Ultra-processed foods are formulated to augment texture and palatability, and to extend shelf life.

Examples of ultra-processed foods include snacks like chips and cookies, sodas, frozen meals, sugary boxed cereal, baked goods, and candy.⁵

LE: Can you give an example of how a healthy food can become “processed”?

Dr. Ziemke: Certainly.

Take an apple for example. Minimally processed would be a prepackaged apple sliced for convenience.

A processed apple is unsweetened applesauce made with apples, water, and ascorbic acid (vitamin C) to prevent browning.

An *ultra*-processed apple is sweetened applesauce with the prior ingredients *plus* high fructose corn syrup.

LE: What has the latest research revealed about the dangers of consuming ultra-processed foods?

Dr. Ziemke: A study published in *The BMJ* in May 2024 showed that high intake of certain ultra-processed foods was linked to an early death.⁶

Researchers at Harvard School of Public Health reviewed food records on more than 114,000 U.S. adults over a 30-year period. Results showed that adults eating mostly ultra-processed foods had a higher risk of death—and greater mortality from neurodegenerative diseases such as Alzheimer’s and dementia—when compared to adults who ate the least amounts of ultra-processed foods

Foods with the strongest impact included processed meats, sugar- and artificially sweetened beverages, dairy-based desserts, and packaged breakfast foods such as waffles, pancakes, and muffins.

Earlier in the year, a meta-analysis looked at information on more than 9.8 million participants. It concluded that those eating more ultra-processed foods had a higher risk of 32 physical and mental health conditions, including obesity, cancer, heart disease, diabetes, depression, and even asthma.¹

LE: What makes ultra-processed foods so harmful?

Dr. Ziemke: Ultra-processed foods negatively impact your health because of what they *do* contain—a high amount of unhealthy ingredients—and because of what they *don’t* contain—they’re lacking essential nutrients like vitamins, minerals, and fiber.

In addition, ultra-processed foods may be as **addictive** as cigarettes.^{7,8}

Ultra-processing combines ingredients that blunt signals in our bodies that let us know we are full. Think of flavored potato chips: perfectly dusty and crisp, designed to melt in your mouth. With a few bites they’ve completely dissolved, and you can easily reach for another handful.

LE: How do UPFs contribute to weight gain?

Dr. Ziemke: Ultra-processed foods are cheap, convenient, and accessible. A study for the National Institutes of Health showed that people eating ultra-processed foods tend to ingest more calories and therefore gain weight.⁹

They are highly palatable and commonly require little to no chewing. They also combine ingredients that affect our brain’s reward centers, alter appetite and fullness signals, and make us crave them even more. They are engineered to be irresistible!

A study by researchers at the National Institutes of Health looked at the impact of ultra-processed foods versus minimally unprocessed foods on energy intake. It was a small sample size but a very interesting study design.⁹





Twenty adults lived in the research hospital for four weeks. They ate unprocessed or minimally processed foods for two weeks, followed by mainly ultra-processed foods for the next two weeks. They were allowed to eat as much as they wanted at each meal.

During the two weeks on **ultra-processed** foods, participants ate about **500 calories** more per day in carbohydrates and fat than they did during the unprocessed food weeks. Not surprisingly, they also gained weight.

This study is currently being replicated to include a larger sample and further evaluation on the risks of ultra-processed foods consumption.

LE: How can people reduce their intake of UPFs?

Dr. Ziemke: Focus on non-processed foods such as fresh fruits and vegetables, lean protein such as chicken and fish, whole grains, and nuts.

In addition, I've found that meal planning is the single most impactful thing you can do on a day-to-day basis to improve the quality of your diet. It involves deciding what you'll eat for the week *in advance*.

Meal planning is not about following a strict diet or denying yourself certain foods. Instead, it is about creating a structured environment where healthy choices are easier to make.

By meal planning, you are less likely to opt for unhealthy food choices and can better align your choices with your health goals or with managing a medical condition if it exists.

LE: What are some of the benefits of meal planning?

Dr. Ziemke: Meal planning helps ensure that we are providing our bodies with the necessary nutrients, such as proteins, carbohydrates, healthy fats, and micronutrients.

It helps us make better food choices when hungry, rather than reaching for the bag of chips or grabbing takeout.

As an added benefit, meal planning helps save time and money, while reducing the daily stress of making meal decisions.

LE: Do you have any meal planning tips to help someone get started?

Dr. Ziemke: In our clinical practice, we use a tool called the Mealplan Method. This simplifies the process of creating balanced meals while giving a sense of flexibility, because life happens.

Each Mealplan is individually tailored to help meet a person's health goals.

Adopting a healthy and positive attitude toward food is critical. It is essential to understand that everyone's nutritional needs and preferences are different.

There's no such thing as a one-size-fits-all meal plan.

Instead of striving for "perfection" in your diet, focus on the positive changes you are making in your food choices.

That will make the biggest impact in the long run.

Dr. Florencia Ziemke has worked at hospitals including Boston Medical Center and Beth Israel Deaconess Medical Center, with affiliations at Boston University, Tufts Medical School, and Harvard Medical School.

She is board certified in Internal Medicine and a diplomate of the American Board of Obesity Medicine. Dr. Ziemke serves as Vice President of the Florida Obesity Society.

For more information about Dr. Ziemke's medical nutrition practice, Evexia Medical, visit: www.evexiamed.com

See also the Meal Planning 101 eBook that is available to download free on the website.

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

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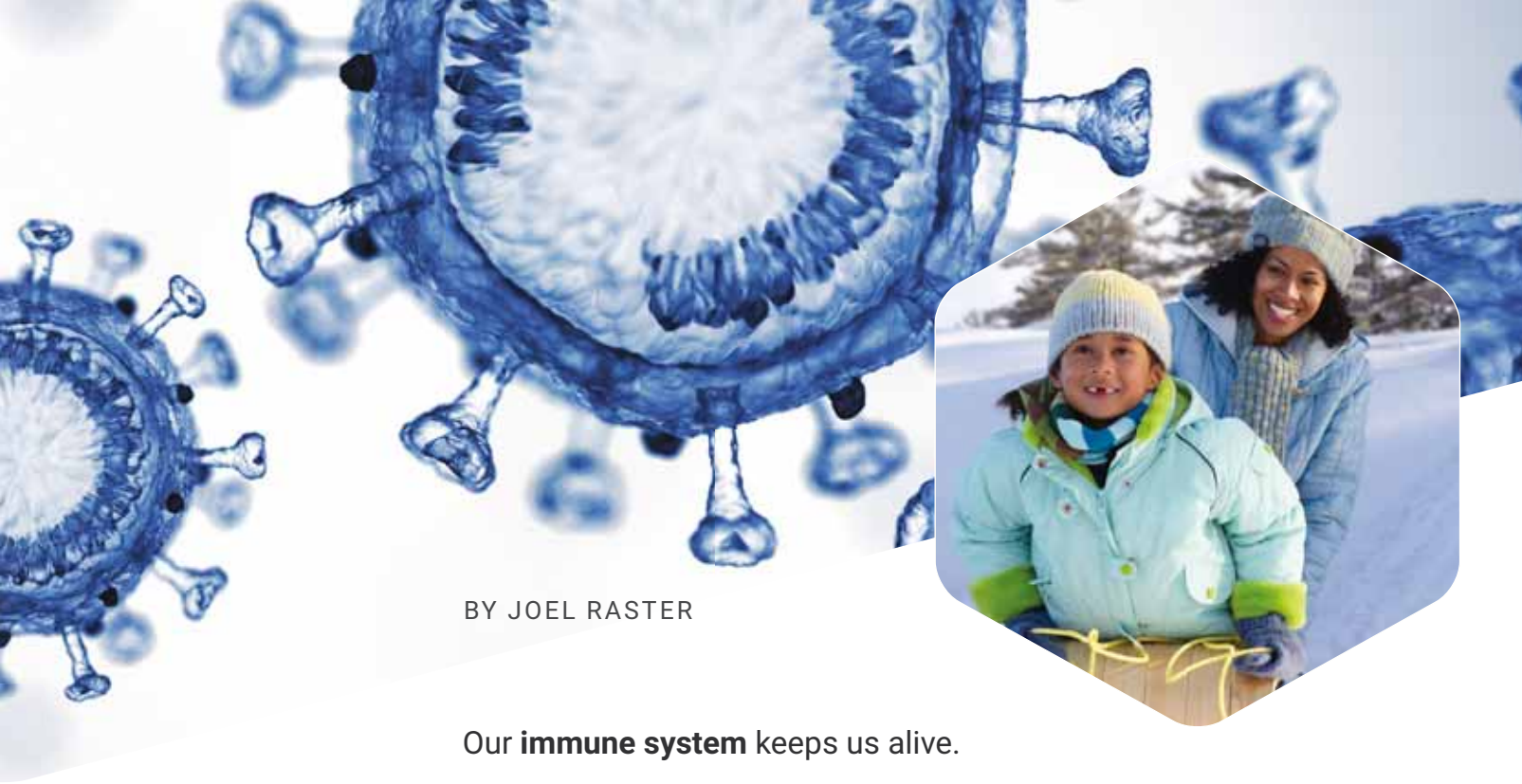
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Lactoferrin

Provides Powerful
Immune Support



BY JOEL RASTER

Our **immune system** keeps us alive.

It prevents and fights **infections**, speeds healing and recovery, and helps remove abnormal cells that become **senescent** or **cancerous**.^{1,2}

But immune function **weakens** with age, resulting in higher rates of infectious disease, cancer, and other illnesses.³

Scientists have found in preclinical and clinical studies that the protein **lactoferrin** can provide much-needed support to immunity, helping to maximize protection.^{2,4-6}

Lactoferrin has been shown in published studies to help bolster immune defenses by:

- Preventing **viruses** from entering cells,^{2,7}
- Activating key **immune cells** and increasing their numbers,^{6,8,9} and
- Increasing production of **interferons**, and immune regulators tied to antiviral defenses.^{6,7,10,11}

Taken orally, **lactoferrin** may help support a healthy immune system that can defend against infections and promote healthy aging.

A Defender of Health

Lactoferrin is a protein found in milk and most body secretions, such as saliva and tears. It is produced by many cell types, including cells of the **immune system**.²

It is one of the key components of breast milk that helps guard infants against infections while their young immune system is still developing.¹²

In the respiratory and gastrointestinal tracts, lactoferrin may support **mucosal defense systems**, which help prevent the entry of potentially harmful bacteria and viruses into body tissues.^{2,4,13} Left unchecked, these pathogens can cause illnesses like the common cold, flu, and gastroenteritis (“stomach flu”).⁷

One of lactoferrin’s greatest potential benefits is its ability to target a wide range of threats.^{2,7} It shields against **many viruses and bacteria** that can cause disease. It also has activity against cells that can become **cancerous**.¹⁴⁻¹⁶

Some of the specific ways lactoferrin benefits immunity, shown in preclinical studies include:

- **Blocking viral entry into cells.** Lactoferrin has been shown to *prevent* viruses from entering cells by binding to viruses directly *and* by blocking features on the surfaces of cells that viruses use to gain entry.^{2,7,10} By impeding viruses from entering cells, infection risk can be reduced.
- **Boosting immune cell function.** Lactoferrin activates, increases the number, and enhances the function of key immune cells. This includes antibody-producing **B cells**, **NK (natural killer)** and **T cells**. The immune system uses the activity of these cells to target cells infected with viruses and other pathogens.^{8,14}
- **Activating interferon production.** Lactoferrin stimulates the synthesis and release of immune mediators including **interferons**, which direct immune cells to target and kill viruses and cells that can become cancerous.^{7,10}
- **Blocking virus reproduction.** When viruses enter cells, they hijack their machinery to turn the cell into a virus production factory, pumping out new virus particles that infect other cells. Lactoferrin can prevent viruses from reproducing in this way.^{7,10,17}

Supporting Immune Function

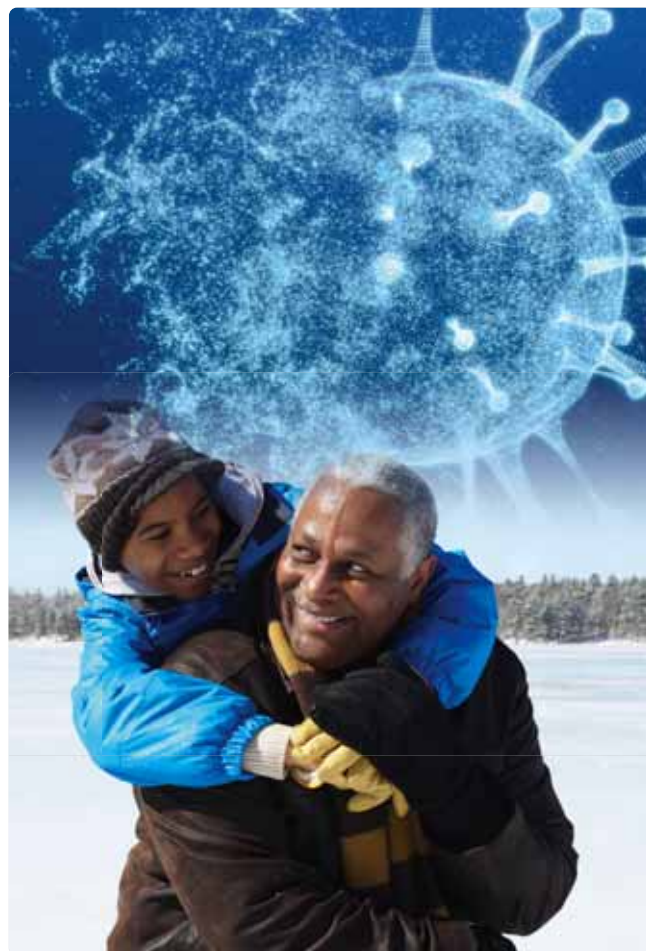
Human studies have confirmed that lactoferrin intake can aid immune function and reduce the frequency and severity of common infections like **colds and flu**.^{8,18-20}

Part of this benefit may be explained by lactoferrin’s effect on **dendritic cells**, which are a critical component of immunity, involved in identifying infectious pathogens and activating immune responses to eradicate the threat.^{11,21} Their activity often dwindles in older age, increasing susceptibility to illness.²¹

In clinical studies of healthy adults and elderly subjects, lactoferrin intake improves the activation and responses of **dendritic cells**.^{8,9}

One of these studies found that this improvement correlates with protection from infection.

Adults who took **200 mg of lactoferrin** daily for 12 weeks had reduced respiratory and **body-wide symptoms**, including sore throat, fever, congestion, sneezing, and runny nose, compared to a placebo group.⁸





What You Need To Know

Defend Against Infections

- With age, our immune system can deteriorate, increasing the risk and severity of infections and age-related disorders.
- Lactoferrin is a protein found in milk and other body secretions and tissues. It helps support healthy immune responses and defends against viruses and bacteria that can cause respiratory and digestive tract infections.
- Human studies confirm that lactoferrin intake can reduce risk for infectious illnesses including the common cold, the flu, the stomach flu, and others.

Defense Against Common Pathogens

Clinical research projects have shown that lactoferrin has benefits against a variety of infectious illnesses.

For example, multiple viruses can cause **colds**, flu, and other **respiratory infections**. Clinical studies show that lactoferrin intake can help reduce risk of respiratory infections and *reduce* their severity and duration when they do occur.^{8,18-20,22}

Human studies have also shown that lactoferrin may *help* prevent or reduce the severity of **gastroenteritis** symptoms caused by various pathogens, including **norovirus** and **rotavirus**.^{7,22-25}

Clinical studies have also found that lactoferrin combined with traditional treatment is more **effective** than traditional treatment alone in managing ***H. pylori*** infection (a bacterial infection associated with gastritis and ulcers).^{26,27}

In a clinical study to assess prevalence and duration of infectious diseases in summer, 310 healthy participants were randomized to receive, for 12 weeks, a daily dose of:²⁰

- 200 mg lactoferrin,
- 600 mg lactoferrin, or
- Placebo.

At the end of 12 weeks the treatment group had a dose-dependent reduced duration of summer colds.²⁰

These and other studies provide evidence that **lactoferrin** can help provide protection against a number of viral and bacterial illnesses.

Summary

Lactoferrin acts in multiple ways to support healthy immunity and defend against common pathogens.

Human studies have shown that lactoferrin intake boosts immune function, even in older adults. It helps support healthy aging by helping to reduce the impact of infections such as the common **cold, flu, and stomach flu.** ■

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

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