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May 2022

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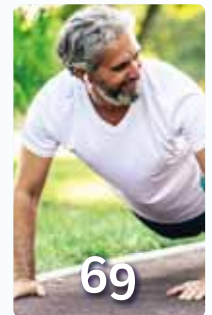
Magnesium can improve blood glucose metabolism; an anti-inflammatory diet may reduce dementia risk; modestly elevated A1c raises risk of cardiovascular disease and overall mortality; L-arginine helps improve erectile dysfunction.

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



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When A Curable Virus Turns Into Cancer



WILLIAM FALOON

People diagnosed with primary **liver cancer** have a median survival of **6 to 20 months**.¹ Only **20%** are alive after five years.²

A major cause of **liver cancer** is the **hepatitis C** virus.

Chronic **hepatitis C** also increases risk of non-Hodgkin's **lymphoma**, head and neck **cancers**,³ liver **cirrhosis**^{4,5} and liver **failure**.⁶

Yet this virus is now curable in **95%** of cases.⁷

This prompted the **U.S. Preventive Services Task Force** to urge at least one-time **blood screening** for all Americans aged 18-79 years.⁸

This recommendation was made because only half of those infected with **hepatitis C** know it and virtually all can be **cured**.

Ribavirin was long ago shown to improve response rates of **hepatitis C** patients treated with **alpha-interferon**.⁹ Newer drugs like Harvoni, Eplclusa, or Vosevi have dramatically **improved** the cure rate.^{10,11}

Few of you know about the **FDA's** delay in approving **ribavirin** and the horrific death toll this inflicted.

This article describes the battle **Life Extension** waged to force the **FDA** to approve **ribavirin**.

I then relay a **low-cost** way to ensure you do not silently harbor a curable **hepatitis C** virus.



About **2.4 million** people in the United States are estimated to have **hepatitis C**.¹² There were an estimated **57,500** new infections as of 2019.¹³

This virus causes chronic **inflammatory** damage that can result in **cirrhosis** and eventual **liver failure**. Without a transplant, liver failure is universally fatal.¹⁴

While the name of the virus is **hepatitis**, it does not stay *only* in the liver. It manifests in other parts of the body and induces other cancers beyond **primary liver cancer**.

Primary liver cancer differs from cancer cells that **metastasize** to the liver from other organs.

The medical term for the most common type of primary liver cancer is **hepatocellular carcinoma**.

Who Is Contracting Hepatitis C?

About **75%** of those infected with hepatitis C in the United States were born between **1945** and **1965**.^{15,16}

People in this age group have around **five times** greater risk of harboring the **hepatitis C** virus.¹⁶

While there are known **risk factors**, many have no identifiable reason that explains why they are infected. That's why **screening** for the **hepatitis C virus** is so important.

Hepatitis C Drug Therapies

For decades, hepatitis C patients endured a six-month treatment using **alpha-interferon**, which caused brutal side effects with no guarantee the virus would be eliminated.¹⁷

When the anti-viral drug **ribavirin** was added to **alpha-interferon**, cure rates markedly improved.¹⁷

The good news today is that several hepatitis C drugs are available that are relatively **non-toxic** and have cure rates **over 95%**.

In certain types of cases, co-administration of **ribavirin** is still used.

Importance of Early Detection

The **hepatitis C virus** inflicts damage to liver cells that often leads to cirrhosis and liver cancer.

It's a leading reason why more than **17,000** Americans are awaiting **liver transplants** today—and no one should think a liver transplant is easy.¹⁸

It is crucial for those infected with hepatitis C to eliminate the **virus** before irreversible liver damage occurs.



The scientific literature strongly supported **ribavirin** plus **interferon** as the best treatment for hepatitis C infections before **1998**.¹⁹

The FDA disregarded these studies because the FDA despised the company (ICN Pharmaceuticals) that made ribavirin. The company's sin was to "publicize" favorable results from ribavirin **clinical trials** showing remarkable efficacy.

The FDA hates when companies promote a drug before approval because it puts pressure on the FDA to approve it sooner.

The FDA would prefer to take their bureaucratic time in approving a new drug rather than capitulate to the pressure of dying Americans who might be cured by a therapy stuck in the FDA's waiting room.

The bureaucratic suppression of **ribavirin** provides a real-world example of what's wrong with today's medical regulatory system.

Clinical studies showed that when **ribavirin** plus **interferon-alpha** were combined, hepatitis C eradication occurred **50%-100% more** often than with **interferon-alpha** alone.²⁰⁻²³

The FDA preferred to punish the maker of **ribavirin** rather than save human lives.

Our Battle to Get Ribavirin Approved

Ribavirin is a broad-spectrum antiviral drug that was approved by virtually every country in the 1980s. It had been shown to significantly suppress hepatitis C infection when combined with **interferon-alpha**.^{22,23}

We at **Life Extension** recognized the efficacy of **ribavirin** in **1983** and fought a monumental battle to force the **FDA** to approve it.

I made national media appearances attacking the FDA for not approving ribavirin even though we had no financial stake in it. Our mission was to spare the tens of thousands of Americans who were dying because the FDA would not allow them access to ribavirin.

Even after the FDA approved ribavirin, it was indicated for hepatitis patients who were naïve to the interferon treatment or who had to fail a grueling **interferon** regimen *before* they could try combination **interferon + ribavirin**.²⁴

Today's System Needs Radical Reform

Science is discovering new therapies to treat killer diseases, but a labyrinth of needless bureaucracy denies Americans access to these lifesaving medicines.



The U.S. Food and Drug Administration (FDA) is a bottleneck in a drug approval process that must be changed if we are to save our bodies from the ravages of **aging** and **degenerative illness**.

Ribavirin is one example of a lethal delay. It took us 12 years to get the FDA to approve this one drug.

In patients who failed interferon therapy, studies show that using the combination **ribavirin + interferon-alpha** was far more effective compared to treating hepatitis C with **interferon-alpha** alone.²⁴

Blood Tests Identify Reversible Cancer Risks

Most people have annual blood tests to check for cardiovascular risk factors like total **cholesterol**, **LDL**, and **triglycerides**.

What few realize is that other blood tests such as **fasting insulin**, **glucose**, and **C-reactive protein** can indicate one's future cancer risk.

Testing for **hepatitis C** is now highly recommended because it is over **95% curable**, but **liver cancer** caused by this **virus** is not.

Those who procrastinate having comprehensive blood tests miss out on opportunities to correct risk factors before symptomatic onset of irreversible degenerative illnesses.

Lab Test Super Sale

Since our founding over **40 years** ago, **Life Extension®** has urged its readers to have annual lab tests.

The numbers of lives saved by our recommendations are huge. This includes men diagnosed with *early-stage prostate cancer* who are readily cured with today's less side-effect-prone treatments.

The most popular **blood test** our supporters order each year is the comprehensive **Male** or **Female Panel**. We charge **\$299** for these tests that cost around **\$2,000** at commercial labs.

This represents an almost **90% savings**.

Just once a year, we discount the prices of our lab tests, enabling readers to obtain the **Male** or **Female Blood Test Panels** for only **\$224**.

This year we are advising most of our supporters to add a hepatitis C antibody test to ensure they are not infected with this **virus** that silently inflicts damage that can lead to **cancer** or **liver failure**.

The retail price of the hepatitis C test is \$50, but we discount it down to **\$34** during the **Lab Test Super Sale** that lasts until **July 11, 2022**.

For most people, just one hepatitis C antibody test is what they need to ensure they are not silently infected.

To order a **Male** and/or **Female Panel** and other tests at the year's lowest prices, call **1-800-208-3444** (24 hours) or log on to: www.LifeExtension.com/blood

You can view the tests included in the **Male** or **Female Panels** on the page to the right.

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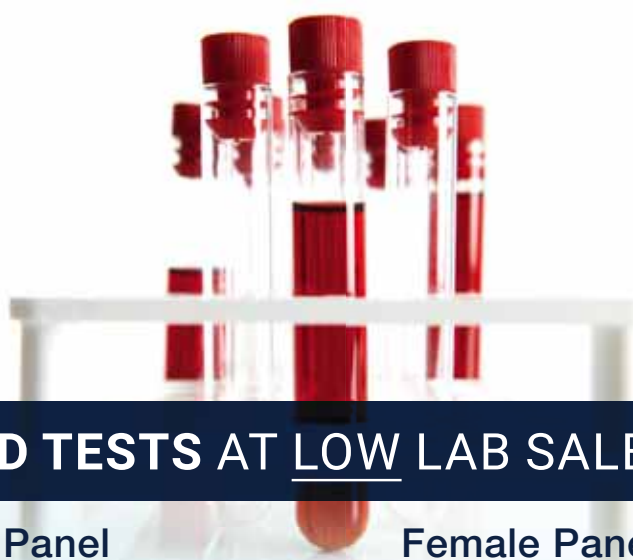
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Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
Blood proteins: albumin, globulin, total protein, albumin/globulin ratio

CARDIAC MARKERS

Apolipoprotein B (ApoB)
Homocysteine
C-Reactive Protein (high sensitivity)

LIPID PROFILE

Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

COMPLETE BLOOD COUNT (CBC)

Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Platelet count

CANCER MARKER PSA (Prostate Specific Antigen)

HORMONES
Free and Total Testosterone
DHEA-S
Estradiol (an estrogen)
TSH (thyroid function)
Vitamin D

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Insulin
Hemoglobin A1c
Ferritin (measure of iron status)
Serum Magnesium
Kidney function tests: creatinine, BUN, uric acid, BUN/creatinine ratio
Liver function tests: AST, ALT, LDH, GGT, bilirubin, alkaline phosphatase
Blood minerals: calcium, potassium, phosphorus, sodium, chloride, iron
Blood proteins: albumin, globulin, total protein, albumin/gl obulin ratio

CARDIAC MARKERS

Apolipoprotein B (ApoB)
Homocysteine
C-Reactive Protein (high sensitivity)

LIPID PROFILE

Total Cholesterol
LDL (low-density lipoprotein)
HDL (high-density lipoprotein)
Triglycerides

COMPLETE BLOOD COUNT (CBC)

Red Blood Cell count including: hemoglobin, hematocrit, MCV, MCH, MCHC, RDW
White Blood Cell count including: lymphocytes, monocytes, eosinophils, neutrophils, basophils
Platelet count

HORMONES
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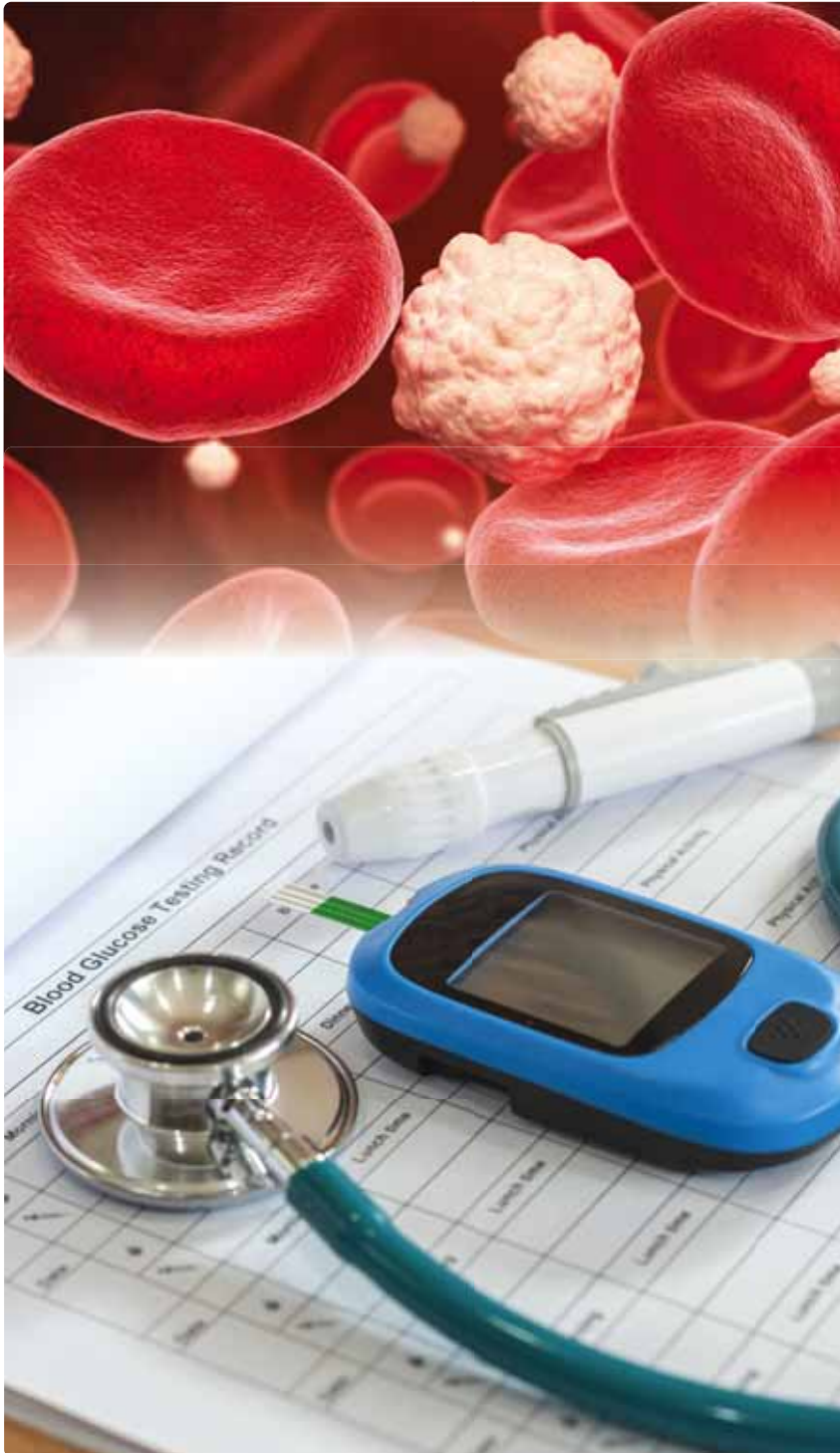
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In the News



Magnesium Supplementation Can Improve Blood Glucose Metabolism

Magnesium supplementation may help improve blood glucose metabolism among people with diabetes and those who are at high risk of developing the disease, according to findings from a meta-analysis of clinical trials reported in *Nutrients*.*

Researchers analyzed 13 randomized trials that evaluated magnesium supplementation's effects on glucose metabolism among diabetics. Twelve trials were additionally selected that evaluated magnesium among participants at high risk of developing the disease.

Compared to a placebo, supplementing with magnesium was associated with significantly lower fasting plasma **glucose** levels in trials that included diabetic participants.

In trials that included people at risk of diabetes, magnesium was significantly associated with lower fasting plasma **glucose** and improved insulin sensitivity.

Editor's Note: Conditions that categorized participants as having a high risk of diabetes included being overweight or having prediabetes, metabolic syndrome or other disorders.

* *Nutrients*. 2021 Nov 15;13(11):4074.

Anti-Inflammatory Diet May Protect Against Dementia

The journal *Neurology*[®] reported an association between greater adherence to an anti-inflammatory diet and a lower risk of dementia.*

The study included 1,059 participants with an average age of 73 years who were free of dementia on enrollment. Dietary questionnaire responses provided information concerning food groups consumed during the previous month. Higher diet scores indicated a greater intake of proinflammatory foods and fewer servings of fruit, vegetables, beans, tea and coffee.

During the three-year follow-up, **6%** of the participants developed dementia. The researchers determined that each one-point increase in dietary inflammatory score was associated with a **21%** increase in dementia, and that participants in the highest third of dietary scores had a **three times greater** risk of dementia compared to participants whose scores were among the lowest third.

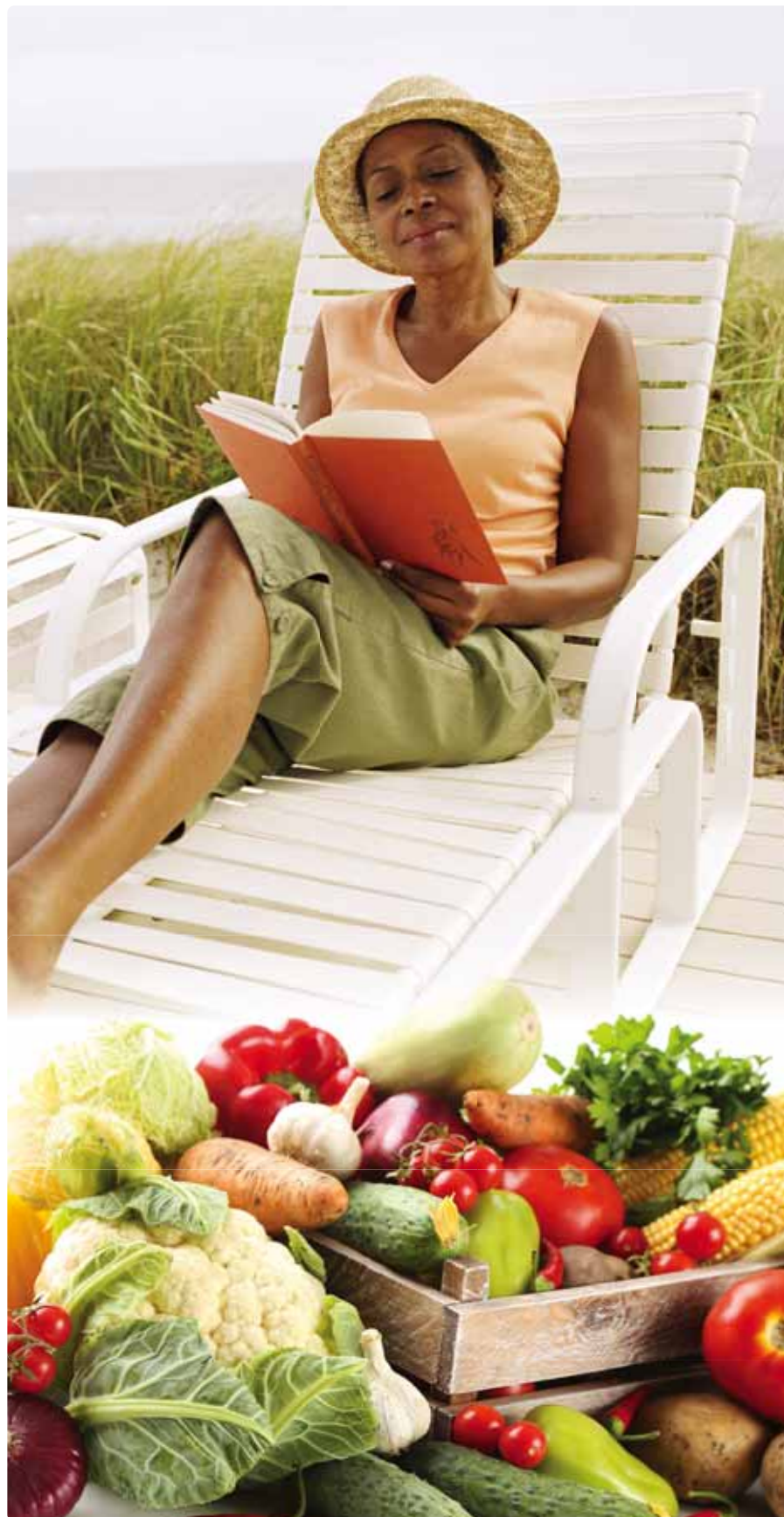
Editor's Note: Participants with the lowest third of dietary scores, indicative of the least inflammatory diet, consumed a weekly average of **20** servings of fruit, **19** servings of vegetables, **four** servings of legumes and **11** servings of coffee or tea per week.

A pro-inflammatory inducing diet includes foods cooked at **high temperature** and excess consumption of **omega-6** fats in relation to **omega-3s**.

Safe (low temperature) ways to cook foods include poaching, boiling, stewing, and steaming.

Dangerous (high temperature) cooking methods include frying, grilling, barbecuing, and roasting.

* *Neurology*. Dec 2021, 97 (24) e2381-e2391.





Modestly Elevated A1c Raises Risk of Cardiovascular Disease

Elevated hemoglobin A1c levels, which are determined by a simple blood test, are associated with increased risk of cardiovascular disease and mortality, according to a study published in *Cardiovascular Diabetology*.*

Researchers used data from six prospective population-based studies including 36,180 people with and without type II diabetes, with a median follow-up of 9.9 years.

The results found that individuals with **A1c** levels above 5.5% had a **higher** risk of **cardiovascular disease** incidence.

Those with an **A1c** above 5.7% had a **higher** risk of **overall mortality**.

Participants with an **A1c** above 5.8% had a **higher** risk of **cardiovascular mortality**.

Note that an A1c of **5.5%** is the upper range of “normal” on **blood test** reports.

This study on modestly elevated **A1c** corroborates the benefits of optimizing one’s A1c. Health-conscious people should target their **A1c** below 5.0%-5.5%.

Editor’s Note: HbA1c levels are used to measure *diabetes* risk, but this study showed the correlation with *cardiovascular* risk as well.

* *Cardiovasc Diabetol*. 2021 Nov 15; 20(1):223.

L-Arginine Helps Improve Erectile Dysfunction

The *Journal of Endocrinological Investigation* published the findings of a recent trial confirming a benefit for supplementation with the amino acid **L-arginine** for men with mild to moderate erectile dysfunction (ED).*

Fifty-one men received **six grams** of L-arginine per day for three months, and 47 men received a placebo. Questionnaires administered at the beginning and end of the study evaluated erectile function. Ultrasonographic examinations of the penis conducted at these times obtained measurements of penile cavernous arterial peak systolic flow velocity (PSV).

Men who received L-arginine had significant improvement in their questionnaire scores, while scores among the placebo group were unchanged. ED category improved among **74%** of treated participants and **24%** achieved scores indicating an absence of the condition.

Editor's Note: The trial included men with vasculogenic ED, which occurs when arteries and/or veins that deliver blood to and from the penis malfunction.

* *J Endocrinol Invest.* 2022 Jan 1.



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References

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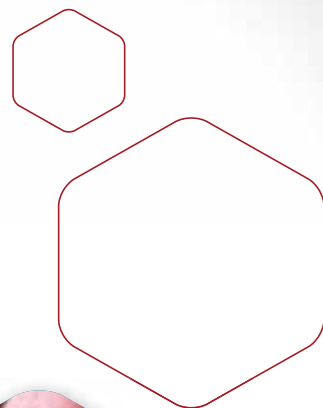
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Patented Blend Targets **BODY WEIGHT** and **WAISTLINE**



BY MICHAEL DOWNEY

Aging adults tend to gain about one or two **pounds** every year.¹

And losing weight is never easy.

Scientists have identified two **plant extracts** that target **fat accumulation** and **fat metabolism**.

Clinical studies have shown that a *patented blend* of these herbal extracts, when combined with a healthy diet and a 30-minute walk, five days per week, can:^{2,3}

- Reduce waist circumference by an average of **4.7 inches**, and
- Decrease hip size by an average of **4.1 inches**.

Doctors frequently recommend that overweight people reduce their weight by **5%** a year to achieve wide-ranging health benefits.

In *just 16 weeks*, this patented **plant extract** blend reduced body weight by an average of **6.7%** when combined with a healthy diet and a 30-minute walk, five days per week.³

For many people, a boost like this is needed to jump-start their resolve to lose **weight** and cut **inches** from their waist and hips.

Fat-Fighting Herbal Extracts

About **three quarters** of the American population are **overweight** or **obese**.⁴

The excess weight people carry around their **waist** is generally the most difficult to lose—and the most dangerous.⁵

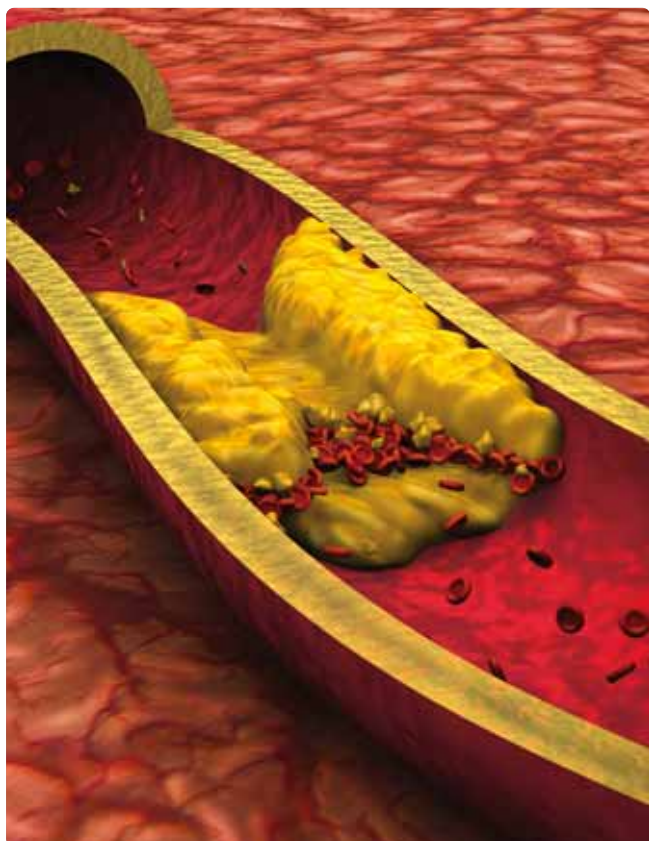
Seeking a solution, scientists screened a variety of **botanicals** to assess their ability to *promote* fat loss and *prevent* fat accumulation.⁶

They identified two plants used in traditional Indian medicine:^{3,6}

- ***Sphaeranthus indicus*** (*S. indicus*) flower, and
- ***Garcinia mangostana*** (mangosteen) fruit rind.

S. indicus is a flowering plant which has long been used in Ayurveda medicine as a nerve tonic and to treat disorders ranging from diabetes and indigestion to fever and cough.⁷

Mangosteen is a tropical fruit that has been used in traditional medicines to treat inflammation, wounds, abdominal pain, urinary tract problems, and chronic ulcers.⁸⁻¹⁰



In a series of clinical studies, researchers tested the impact of a patented blend of ***S. indicus*** flower extract plus **mangosteen** fruit rind extract on **weight loss**.

Help for Overweight People

Scientists conducted a placebo-controlled, randomized **human** trial in men and women who were **overweight** (with an average BMI of **28.3 kg/m²**).³

Over the 16-week study, subjects consumed a balanced diet of approximately **2,000 calories** a day. They were also instructed to walk for **30 minutes** per day, five days a week.³

Half of the subjects received **400 mg** of the ***S. indicus-mangosteen*** blend before breakfast and dinner. The others received placebos.

After 4, 12, and 16 weeks, the ***S. indicus-mangosteen*** supplemented group showed significantly **greater weight loss** compared to the placebo group.³

At **16 weeks**, the average results for the group taking the **herbal extracts** were striking:³

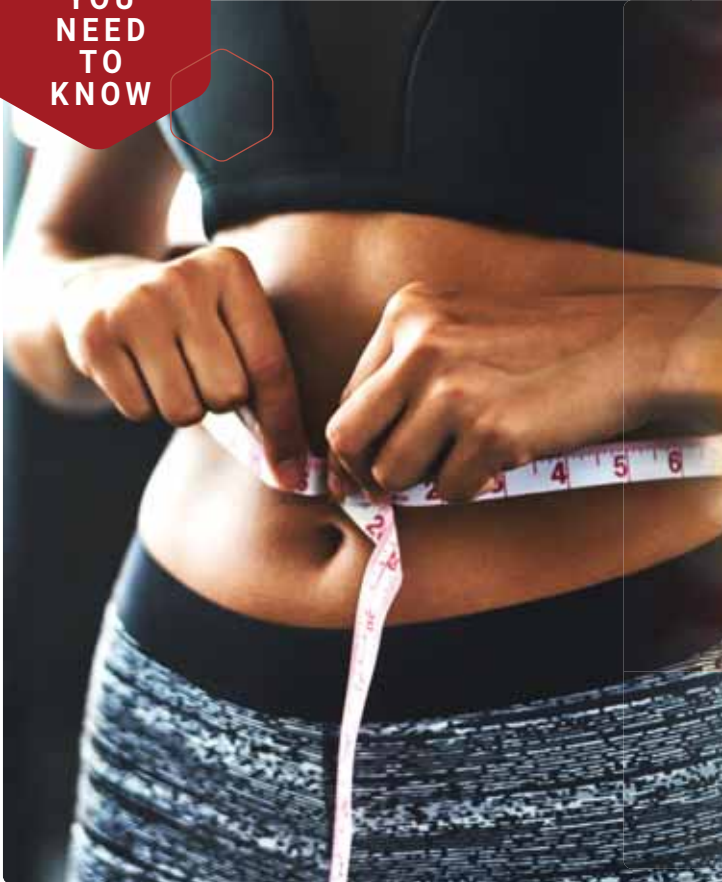
- **Weight** was reduced by **11.2 pounds (6.7%)**, compared to 2.4 pounds (**1.4%**) for those taking placebos,
- **BMI** (Body Mass Index) was reduced by **1.9 kg/m²** compared to **0.4 kg/m²** in the placebo group,
- **Waist** circumference was reduced by **3.9 inches**, compared to **1.5 inches** in the placebo group, and
- **Hip** circumference was reduced by **4.1 inches**, compared to **2 inches** for those taking placebos.

Reduction in Obesity

Another team of scientists studied the effects of this same patented herbal blend on people who were **obese**, with a **BMI** of **30** or higher.²

Over eight weeks, participants consumed a prepared diet of roughly **2,000 calories** a day and walked for **30 minutes** per day, five days a week.

Half of the subjects received placebo capsules, while the others received **400 mg** of the ***S. indicus-mangosteen*** blend **twice** daily, before breakfast and dinner.²

WHAT
YOU
NEED
TO
KNOW

Help Losing Weight and Fat

- Many people struggle to lose weight, and even those who do find it difficult to reduce the size of their **waistline**.
- A patented blend of ***Sphaeranthus indicus*** flower and **mangosteen** fruit rind extracts produces meaningful weight loss and significantly reduced the size of waist and hips, when combined with a balanced diet and exercise.
- In a controlled clinical trial of overweight individuals, this patented blend of ***S. indicus-mangosteen*** extracts decreased weight by an average of **11.2 pounds**, reduced waist size almost **four inches** on average and decreased hip size and body mass index in just **16 weeks**.
- The patented blend of ***S. indicus-mangosteen*** extracts also reduced **triglycerides, LDL** ("bad") cholesterol, and total **cholesterol** levels, which helps improve cardiovascular health.

Improved diet and exercise helped both groups lose weight.

The ***S. indicus-mangosteen*** supplemented group had **significantly greater weight loss** and dropped approximately **twice** as many **inches** from their waistline and hips than the **placebo** group.

After just **8 weeks**, these **obese** individuals taking the two **herbal extracts** on average had their:²

- **Weight** reduced by **11.5 pounds**, compared to **3.3 pounds** for the placebo group,
- **BMI** reduced by **2.2 kg/m²**, compared to just **0.6 kg/m²** for those taking placebos,
- **Waist** circumference reduced by **4.7 inches**, compared to **2.4 inches** in the placebo group, and
- **Hip** size reduced by **2.5 inches**, compared to **1.2 inches** for subjects receiving placebos.

There were no safety issues in either of the studies, and no adverse effects were reported.^{2,3}

How the Herbal Extracts Work

In vitro (laboratory) studies have been conducted showing the ***S. indicus-mangosteen*** extract blend inhibits creation of new **fat cells** while promoting the breakdown of *existing* fat cells.^{3,6}

These cell-based studies showed that the patented blend of ***S. indicus-mangosteen*** extracts may:

- Reduce levels of **ADRP** (*adipocyte differentiation-related protein*), a factor that stimulates the accumulation of fat. Lowering ADRP levels inhibits fat storage.⁶
- Reduce levels of **fatty acid synthase**, an *enzyme* that catalyzes the synthesis of fatty acid. Lowering this enzyme inhibits the creation of new fat.³
- Inhibit expression of **perilipin**, a protein that coats fat droplets and keeps them from being broken down. Reducing perilipin allows fat to be broken down more easily.⁶
- Decrease expression of **PPAR-gamma**, a metabolic “sensor” that triggers fat storage and production of new adipose cells. Lowering PPAR-gamma expression helps prevent fat from accumulating.⁶

Together, these actions help reduce fat accumulation and spur fat breakdown, potentially explaining the **weight** and **waistline** reductions seen in human trials.

Improved Cardiovascular Markers

The benefits of this patented blend of ***S. indicus-mangosteen*** extracts go further.

In the study of **overweight** individuals, researchers noted an improvement in **lipid** measurements, critical markers of cardiovascular health.³

Levels of dangerous **triglycerides** and **VLDL** (very low-density lipoprotein cholesterol) that were **elevated** at the start of the study dropped almost to the **normal** range. Overall cholesterol and LDL were also reduced.³

In just **16 weeks**, and compared to placebo, subjects taking the dual-patented blend on average had their:³

- **Triglycerides** decreased by **22%**,
- **Cholesterol** decreased by **12%**,
- **LDL** (“bad”) cholesterol decreased by **16%**,
- **VLDL** cholesterol decreased by **19%**,
- **HDL** (“good”) cholesterol increased by **6%**, and
- **LDL/HDL** ratio decreased by **18%**.





Benefits of Reducing Weight by Just 5%

Setting unrealistically high goals can doom any weight-loss program.

Experts agree that losing just a **few pounds** can make a huge difference, and many point to the substantial benefits of a reasonable and *achievable* **5%** reduction in weight.

Evidence shows that decreasing your weight by only **5%** may:^{11,12}

- Protect knee **joints** and reduce the risk of **osteoarthritis** of the knee,
- Help prevent or delay **type II diabetes**,
- Help diabetics control **blood sugar** and inhibit diabetes-related conditions,
- Increase levels of protective **HDL** cholesterol, lowering the risk of heart disease,
- Decrease levels of **triglycerides**, reducing the risk of heart attack or stroke,
- Lower systolic **blood pressure** by about **five points**,
- Improve **sleep** and reduce **sleep apnea**, and
- Help reverse **insulin resistance**.

In controlled clinical studies, people who took a patented blend of **S. indicus** and **mangosteen** extracts lost an average of between **6.4%** and **6.7%** of their body weight, when combined with a balanced diet and exercise.^{2,3,6}

Together with the reduction in **body weight**, these changes in blood **lipids** can provide additional protection against an array of cardiovascular disorders and other vascular disorders.³

Summary

Being **overweight** or **obese** poses serious health risks. Excess weight around the **waist** is especially dangerous.

Scientists have identified two **plant extracts** that, when combined in a specific ratio, decrease weight by an average **6.7%** within **16 weeks**, when combined with a balanced diet and regular exercise.

In controlled clinical trials, this patented blend of **S. indicus** flower and **mangosteen** fruit rind not only produced meaningful **weight loss**, but also substantially decreased the size of **waist** and **hips**.

In an additional benefit, artery-clogging blood **lipid** levels improved significantly, providing extra benefits for heart health. •

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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Overlooked Dangers of ELEVATED HOMOCYSTEINE





BY PAZ ETCHEVERRY, MS, PHD

Doctors often overlook an amino acid in the blood called **homocysteine** that can increase risk of:

- Cerebral vascular disorders,
- Dementia,
- Arterial calcification, and
- Hearing loss.

There are many ways that elevated homocysteine can harm health.

Since 1981, **Life Extension** has advised annual monitoring of homocysteine status with a simple blood test.

A young, healthy body can reduce homocysteine by converting it to non-toxic compounds.

Older individuals often need **B vitamins** to reduce homocysteine to youthful ranges.

What is Homocysteine?

Homocysteine is an amino acid produced in the body during the metabolism of a common dietary amino acid called **methionine**.^{1,2}

Vitamins B6, B12, riboflavin (vitamin B2), and **folate** help break down homocysteine into other, beneficial amino acids.²⁻⁵

Deficiencies in these vitamins may lead to elevated homocysteine levels, a condition known as **hyperhomocysteinemia**.⁶

Elevated homocysteine may also arise from genetic defects or mutations in **enzymes** involved in the metabolism of methionine.^{1,7}

The Risks of High Homocysteine Levels

Elevated homocysteine has been associated with the development of **atherosclerosis, stroke, cognitive disorders**,² and **hearing loss**.⁸

The normal homocysteine blood range for commercial laboratories is between **5 and 15 micromoles per liter ($\mu\text{mol/L}$)**.

Life Extension believes that homocysteine levels **below 12 $\mu\text{mol/L}$** are good and that the ideal blood levels should be below **8 $\mu\text{mol/L}$** , much lower than the currently accepted **<15 $\mu\text{mol/L}$** .



Homocysteine Harms Arterial Health

The potential role of elevated homocysteine as a risk factor for **vascular calcification progression** was suggested in a study published in **2020** in the **Journal of the American Heart Association**.⁹

Calcification of arteries and heart valves is considered irreversible, though **Life Extension** is researching methods to reverse calcified tissues.

Elevated homocysteine is an independent risk factor for **atherosclerosis**.¹⁰

In a study in Africa, patients who had suffered a **stroke** were found to have, on average, significantly **higher** homocysteine levels than healthy subjects. They also had **lower** average **vitamin B12** levels.¹¹

A 2020 review of human studies involving more than **11,000** participants determined that **high homocysteine levels** were associated with increased risk of **stroke**. For every **1 $\mu\text{mol/L}$** increase in homocysteine, the relative **risk for stroke** increased by **6%**.¹²

Researchers believe homocysteine may cause arterial damage and reduce the flexibility of blood vessels. It may also contribute to **oxidative stress** and **inflammation** in blood vessels and reduced production of **nitric oxide**, a key compound for endothelial health.¹

Homocysteine may also increase dangerous **clotting** in the blood,¹ reduce the synthesis of **HDL** (“good”) cholesterol,¹³ and promote the oxidation of **LDL** (“bad”) cholesterol, which contributes to **atherosclerosis**.¹⁰

Brain Aging

Evidence shows that elevated homocysteine plays a role in **brain aging**.

MRI scans of 36 healthy volunteers between ages 59 and 85 revealed that those with **higher** homocysteine levels had greater **loss of white matter**. This **brain** tissue is composed of fibers that conduct nerve signals.^{14,15}

Some evidence suggests that elevated homocysteine may increase the risk of **Alzheimer’s disease**.¹⁶

For example, individuals with elevated homocysteine levels are more likely to have markers of **Alzheimer’s disease** progression in brain tissue, including neurofibrillary tangles, dysfunctional protein accumulation, and brain shrinkage.¹⁷

One meta-analysis found that every **5 $\mu\text{mol/L}$ increase** in homocysteine levels is associated with a **15%** increase in Alzheimer’s disease risk.¹⁸

WHAT
YOU
NEED
TO
KNOW



In patients with Parkinson's disease, elevated homocysteine has been associated with worse cognitive function.¹⁹

Even *modest* elevation of homocysteine within the normal range ($>11 \mu\text{mol/L}$) has been associated with a substantial increase in risk of dementia in the elderly.¹⁷

Hearing Loss

A range of studies over the past 20 years have shown that high homocysteine levels are associated with **hearing loss**.

One **2019** study found that among 52 patients experiencing sudden **hearing loss**, **63%** had *higher* than normal homocysteine levels.²⁰

Another study the same year noted that participants with **sudden deafness** had *higher homocysteine* levels and *lower folate* levels than those with normal hearing.²¹

Australian researchers reported that of 2,565 study participants, those with high homocysteine levels had a **64%** increased likelihood of **hearing loss**. Low folate levels also increased the odds of mild hearing loss.²²

Keeping Homocysteine at Safe Levels

- **Homocysteine** is a non-essential amino acid produced in the body.
- High homocysteine levels can be **toxic**, increasing risk for cerebrovascular disease, brain disorders, and hearing loss.
- A simple blood test can determine homocysteine status. Levels above **15 $\mu\text{mol/L}$** are considered high, and **Life Extension** recommends maintaining levels below **12 $\mu\text{mol/L}$** , with levels less than **8 $\mu\text{mol/L}$** being optimal.
- The body relies on **B vitamins** to lower homocysteine levels. Oral intake of **vitamin B6, vitamin B12, folate, and riboflavin** can safely reduce homocysteine concentrations in the body.

Strategies to Lower Homocysteine

Several **B vitamins** can help safely reduce homocysteine levels.^{23,24}

Vitamin B6 aids the body in metabolizing homocysteine because a B6-dependent enzyme converts homocysteine into **cysteine**, a beneficial amino acid.²⁵

In vitamin B6-deficient patients with asthma, taking vitamin B6 daily for six weeks considerably reduced homocysteine levels.²⁵

Vitamin B12 and **folate** are vital for the conversion of homocysteine into **methionine**, reducing homocysteine levels in the body.

In a study of post-menopausal women, those taking **5 mg** per day of **folic acid** for six weeks had lower homocysteine levels than those taking a placebo.²⁶

According to a systematic review, **folic acid** intake in people with **type II diabetes** decreases homocysteine levels and may improve glucose levels, compared to placebo.²⁷

Riboflavin (or vitamin B2) is particularly useful for people who have a mutation in the **MTHFR enzyme**. Mutations in this enzyme lead to high homocysteine levels.

In one study, taking **riboflavin** daily for 12 weeks decreased homocysteine levels in subjects with a mutation in MTHFR by **22%**.²⁸

In another study of subjects over age 60 with low riboflavin levels, taking riboflavin daily for just four weeks lowered homocysteine concentration by **1.31 µmol/L**.²⁹

One of the nutrients most associated with reducing high levels of homocysteine is folate, which works to methylate and thus detoxify homocysteine.^{30,31}

A separate but related role for methylation and folate is in DNA methylation, an epigenetic way that the body regulates gene expression.³²

Therefore, adequate folate is needed to prevent accumulation of excessive toxic homocysteine, but also to support healthy DNA methylation.

The most efficient way to supplement folate is to take it in the form the body actually uses—the activated form, variously referred to as **5-methyltetrahydrofolate**, **5-MTHF**, or **L-methylfolate**.³³

The **5-MTHF** form of folate is readily available to cells, to promote detoxification of homocysteine and support healthy DNA methylation.

Testing and Dosages

A simple **blood test** can determine homocysteine status. We recommend it be repeated annually as part of your standard yearly testing.

Though levels above **15 µmol/L** are considered high, **Life Extension** recommends maintaining levels below **12 µmol/L** and considers under **8 µmol/L** to be optimal.

Those trying to lower homocysteine should take B vitamins daily. Here are daily B vitamin suggestions:

- **Vitamin B6** as pyridoxal 5'phosphate, **100 mg to 200 mg**
- **Vitamin B12** as methylcobalamin, **300 mcg to 1,000 mcg**
- **Folate** as 5-methyltetrahydrofolate (5-MTHF), **1,000 mcg to 10,000 mcg**
- **Vitamin B2** as riboflavin, **25 mg to 100 mg**

Getting tested again three months after starting these nutrients can ensure they are working properly to achieve optimal homocysteine levels.





Summary

Elevated levels of the amino acid **homocysteine** (above **15 $\mu\text{mol/L}$**) can contribute to increased risk for conditions that damage the blood vessels, brain, and hearing.

The body relies on adequate levels of B vitamins to break down homocysteine. Taking **vitamin B6**, **vitamin B12**, **folate**, and **riboflavin** is a safe and effective way to reduce high homocysteine concentrations. •

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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^oDEF (Dietary Folate Equivalents)

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A photograph of a male doctor in a white lab coat and stethoscope, looking down at a clipboard he is holding. He is wearing a blue shirt and a patterned tie. To his right, the profile of an elderly male patient with grey hair is visible, looking towards the doctor. The background is a bright, out-of-focus clinical setting.

REVERSE
Nonalcoholic
FATTY LIVER
DISEASE



NAFLD

BY RICHARD MOORE

Most people have never heard of **NAFLD**.

Yet nearly **one in four** adults in the U.S. has **nonalcoholic fatty liver disease (NAFLD)**.¹⁻⁴

In the long term, NAFLD can cause **fibrosis** (scarring) of the liver, significantly impairing normal liver function.⁵⁻⁷

Advanced scarring, known as **cirrhosis**, is irreversible and can lead to **liver failure**.

The only treatment at that point is a liver transplant.⁸

Normal ways to address NAFLD include diet and lifestyle changes, and weight loss.

Innovative approaches include the medication **metformin** and certain nutrients.

Specific **probiotics** can now be added to this list.

In two clinical trials of people with **NAFLD**, a carefully designed blend of **probiotics** and a **prebiotic** decreased a marker of **liver damage** and reduced levels of **fibrosis** (scarring) from **moderate** or **almost severe** to **normal**.^{9,10}

These findings suggest that the **probiotic-prebiotic blend** not only stopped the *progression* of the liver disease, but even **reversed existing liver damage**.

What Is Nonalcoholic Fatty Liver Disease?

Fat accumulation and **inflammation** in the **liver** can lead to chronic liver damage, scarring, and eventual liver failure.

In the past, **alcohol** abuse and viral **hepatitis** were the leading causes of chronic liver disease and death from liver cirrhosis.

NAFLD is now the number one chronic liver disease, and cause of liver cirrhosis deaths, in the United States.^{11,12}

Back in the 1980s, experts first started to report on a newly recognized phenomenon: **fat** accumulating in the liver with *no* connection to alcohol intake or viral infection.¹³

The earlier phases of this condition are now referred to as **nonalcoholic fatty liver disease (NAFLD)**, which accounts for about **75%** of all chronic liver disease in the U.S.¹⁴ It affects roughly **25%** of adults, both in the U.S. and across the world.^{4,11}

When the disease becomes more severe, it is called **nonalcoholic steatohepatitis (NASH)**. At this point, it can lead to liver **cirrhosis**, which is *severe* scarring of and damage to the liver.²

This damage to the liver is *irreversible* and can lead to complete **liver failure**.⁸

NAFLD Smolders Before Symptom Onset

NAFLD is common in **obese** adults, with around **50%-90%** showing signs of **fatty liver** as the disease advances.¹⁵

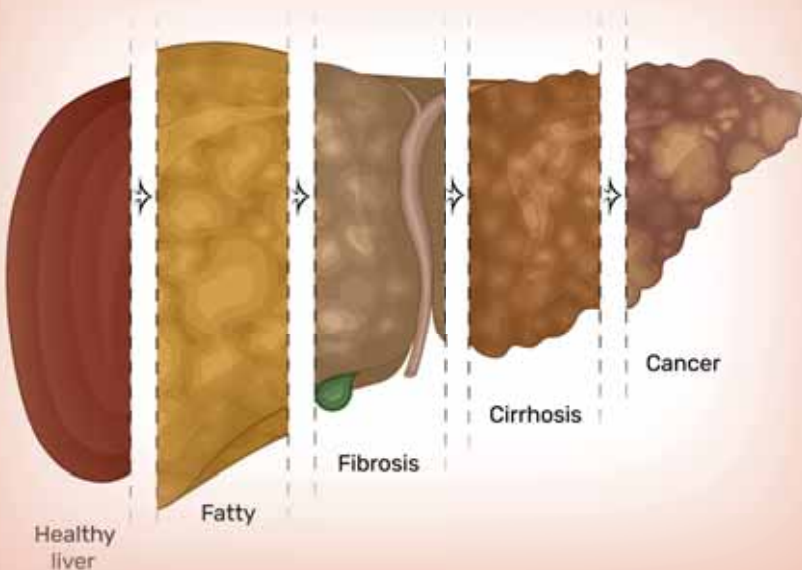
But fatty liver disease can affect *anyone* with a metabolic disease such as **metabolic syndrome** or **type II diabetes**.¹⁶

In its *early* phases, **NAFLD** rarely causes specific signs or symptoms.¹⁷

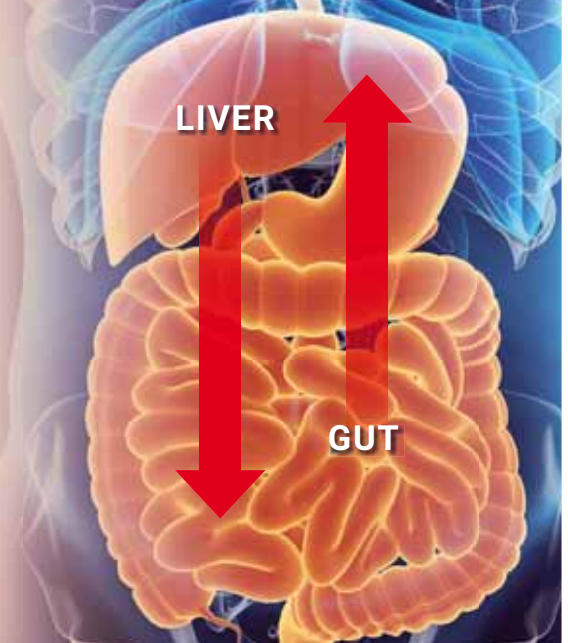
Symptoms of *early-stage* NAFLD may include:¹⁷

- Abdominal (belly) weight gain
- Increase in cholesterol
- Hypertension
- Pain in the upper right abdomen
- Persistent tiredness/fatigue
- Binge eating

STAGES OF LIVER DAMAGE



THE GUT-LIVER AXIS



By the time major NAFLD symptoms manifest, significant scarring and hardening of the liver have already been inflicted. Symptoms of a more advanced disease may include:¹⁸

- Abdominal swelling (ascites)
- Swollen lower legs (edema)
- Enlarged blood vessels beneath the skin's surface
- Enlarged spleen
- Red palms
- Yellowing of the skin and eyes (jaundice)

At advanced stages, NAFLD causes damage to the brain, vasculature, and other essential tissues.

An Interesting Finding

Researchers noted that fatty liver and liver damage are often seen in patients suffering from **gastrointestinal conditions**, including inflammatory bowel and celiac disease.^{19,20}

One thread that ties together metabolic disorders and **nonalcoholic fatty liver disease** is an unhealthy gut microbiota or microbiome.

The gut microbiota or gut flora is the population of different types of microorganisms—primarily bacteria—that naturally inhabit our gut.

A healthy, diverse microbiota is thought to promote health, but an unhealthy one is associated with the opposite.^{21,22}

The Gut-Liver Connection

Here's why the connection between **gut health** and **liver health** is so strong:

Most of the blood draining from the **gastrointestinal tract** (or **gut**) travels directly to the **liver** before entering general circulation.

This means that potentially harmful microorganisms, toxins, and other substances travel first to the **liver** after leaving the intestines.

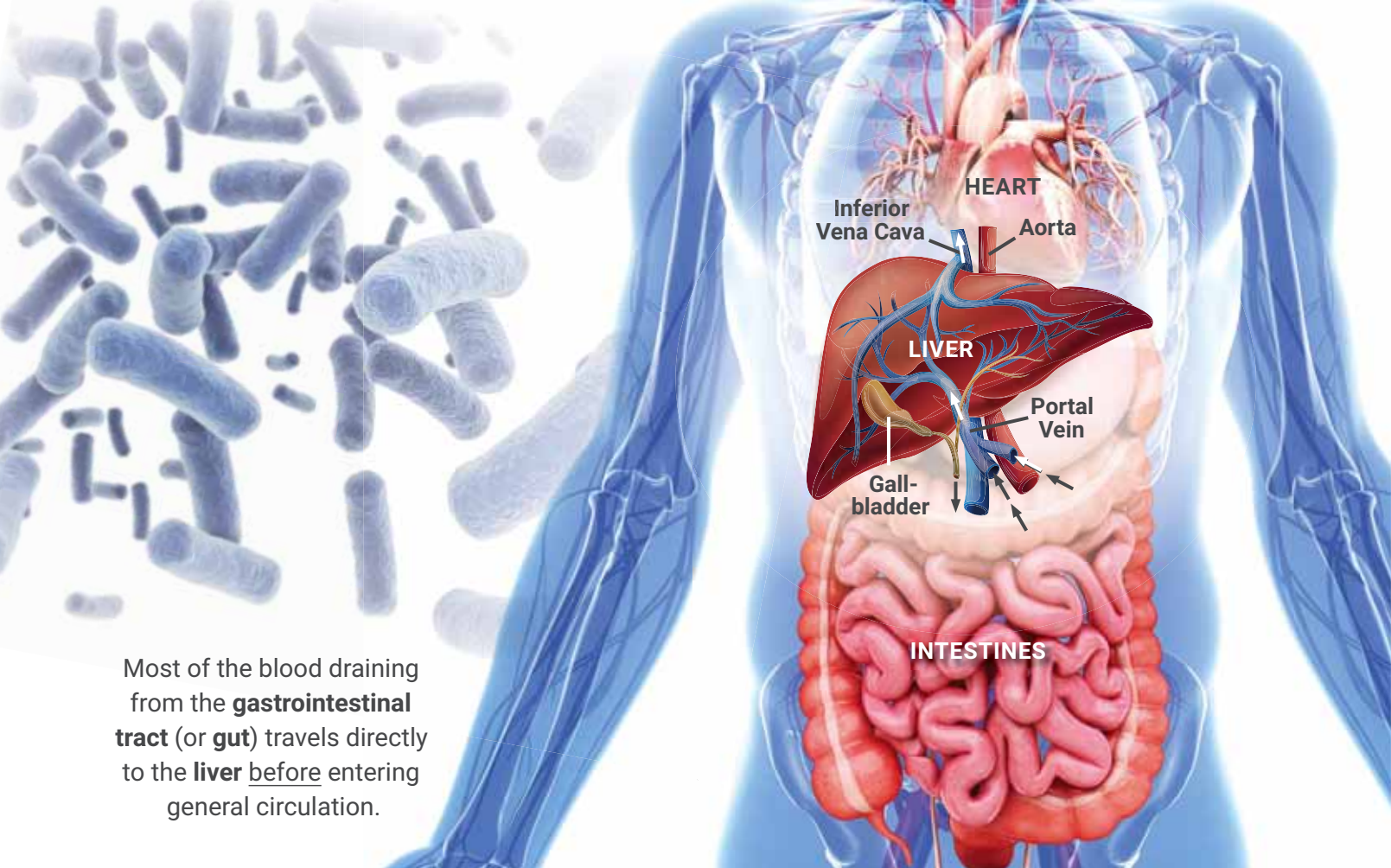
An **unhealthy** mix of microorganisms in the gut also leads to **inflammation** in the intestines and what's known as "**leaky gut**."²³ That causes more and more microorganisms and toxic compounds to make their way directly to the **liver**.



WHAT
YOU
NEED
TO
KNOW

New Hope for Fatty Liver Disease

- **Nonalcoholic fatty liver disease (NAFLD)** is the most common cause of liver disease in Western countries. In its severe form, it can lead to liver failure and increase the risk of liver cancer.
- There are generally no warning signs or symptoms of NAFLD until damage to the liver is already severe and irreversible. No drugs are currently approved to treat it.
- Scientists have found that the population of microorganisms in the **gut** (the microbiota) have a dramatic impact on liver health.
- In two clinical trials of patients with NAFLD, a mix of **seven probiotic strains** combined with a **prebiotic** reduced liver scarring and markers of ongoing liver damage. In other words, this blend stopped the progression of NAFLD and reversed existing liver damage.



Most of the blood draining from the **gastrointestinal tract** (or **gut**) travels directly to the **liver** before entering general circulation.

The result of this toxic flow from the intestines causes oxidative stress and chronic inflammation, which contribute to **nonalcoholic fatty liver disease** and long-term liver damage.

Animal studies have shown that *worsening of the gut microbiota* can worsen fatty liver, while increasing beneficial bacteria can improve the health of the liver.^{24,25}

As a result, improving the health of the microbiota and the gut with **probiotics** has become a major target of research into fighting **fatty liver disease**.

A Probiotic-Prebiotic Combination

Despite over four decades of research, there are still **no medications** approved by the U.S. Food and Drug Administration (FDA) to treat fatty liver disease.

Treatment is usually weight loss, through a combination of a healthy diet and exercise.

While weight loss is often crucial, scientists designed a blend of **microorganisms** they believed would favorably impact the liver, reducing risk and severity of **nonalcoholic fatty liver disease** (NAFLD).

In **two clinical trials**, a specific **probiotic formulation** has shown promising results for improving liver health.^{9,10}

This formula is a blend of **seven** different probiotic strains:

- Lactobacillus casei PXN® 37,
- Lactobacillus rhamnosus PXN® 54,
- Streptococcus thermophilus PXN® 66,
- Bifidobacterium breve PXN® 25,
- Lactobacillus acidophilus PXN® 35,
- Bifidobacterium longum PXN® 30, and
- Lactobacillus bulgaricus PXN® 39.

To provide maximum benefits, probiotics need to thrive and outcompete harmful bacteria.

For this reason, scientists combined these probiotics with **fructooligosaccharide (FOS)**, a form of dietary fiber found in many plants. FOS serves as a **prebiotic**, a nutrient that “feeds” healthy bacteria.

With this extra energy source, the healthy bacteria are better equipped to survive and improve liver function and heal the liver.

Combating Fatty Liver: The First Study

Two **human** trials evaluated the use of this **probiotic-prebiotic** combination on subjects with a diagnosis of **nonalcoholic fatty liver disease**.

In the first, overweight and obese adults with NAFLD were randomized to receive the **probiotic-prebiotic** blend or a **placebo** for 28 weeks.⁹

At the study's start, every subject had elevated **liver enzyme** levels in the blood, evidence of ongoing **liver damage**.

Over the course of the study, *enzyme* levels in the **placebo** group didn't change. But those receiving the **probiotic blend** had multiple **liver enzymes** fall into the **normal range**.

In addition, all subjects at the start of the study had *above normal* levels of **fibrosis** in the liver, as identified by a specialized **ultrasound** technology specifically designed to assess liver fibrosis and fattiness. On average, this scarring was **moderate** to **almost severe**.

The group receiving the **probiotic-prebiotic** blend dropped their **fibrosis scores** all the way into the **normal** range. The **placebo** group had no significant change by the end of the study.

These findings suggest that the **probiotic-prebiotic** blend stopped the progression of liver disease and **reversed liver damage** that was already present.

Combating Fatty Liver: The Second Study

The second study had a similar design, but enrolled adults with **NAFLD** who were *not* overweight or obese.¹⁰

The findings echoed those from the first study. Evidence of ongoing **liver damage** was reduced significantly in those receiving the **probiotic-prebiotic** blend, and **fibrosis** scores dropped into the normal range.²⁶

In a further benefit, in both studies the group taking the **probiotic-prebiotic** blend had a substantial decline in **C-reactive protein** blood levels. C-reactive protein is a marker of systemic **inflammation**, indicating that overall inflammation was reduced.

This probiotic-prebiotic blend offers a way to lessen or even reverse the damage done by nonalcoholic fatty liver disease.



Other Nutrients That Promote Liver Health

Some nutrients have also shown promise as a way to help control nonalcoholic fatty liver disease.

- In human trials, **vitamin E tocotrienols** improved markers of liver health seen on an ultrasound, while reducing liver enzymes, C-reactive protein, and signs of oxidative stress.²⁷⁻²⁹
- **Phosphatidylcholine** is an essential phospholipid which is a vital part of cellular membranes. Essential phospholipids have been used safely for years to protect liver function in patients with various liver diseases.³⁰ In a number of human trials, phosphatidylcholine intake alone or with other nutrients improved NAFLD, reducing liver enzyme levels and improving ultrasound findings.³⁰⁻³² A more bioavailable form of phosphatidylcholine known as **polyenyl-phosphatidylcholine** or **PPC** is the preferred choice for liver support as it specifically targets hepatocytes.
- Extracts of the herb **milk thistle**, containing the compound **silymarin**, have long been used to protect liver function in patients with liver disease. Several clinical trials found that milk thistle, alone or in combination with vitamin E, and phosphatidylcholine reduces liver fat, fibrosis, and enzyme levels in patients with NAFLD.³³⁻³⁶
- **N-acetyl cysteine (NAC)**, a versatile sulfur-rich compound prevents liver damage following acetaminophen poisoning.³⁷ NAC rapidly restores depleted **glutathione** levels, sparing liver cells from the effects of oxidative damage.³⁸⁻⁴⁰

Summary

Nonalcoholic fatty liver disease affects roughly a **fourth** of the adult population in the U.S.

This progressive liver condition can lead to **liver cirrhosis** and **liver failure**, requiring a transplant. It is also a major contributor to the development of liver cancer.

Research has found a link between the **microbiome** and liver health.

Two clinical studies confirm that a specially formulated blend of **seven probiotics** and a **prebiotic** can help stop the progression of **NAFLD** and reverse the damage already done. ●

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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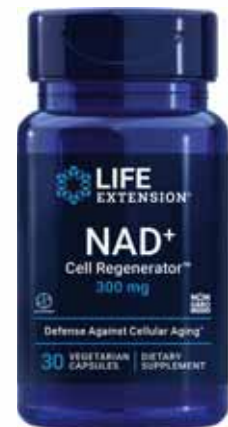


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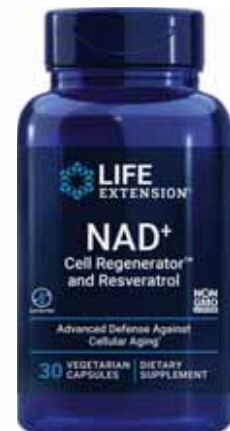
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Reference

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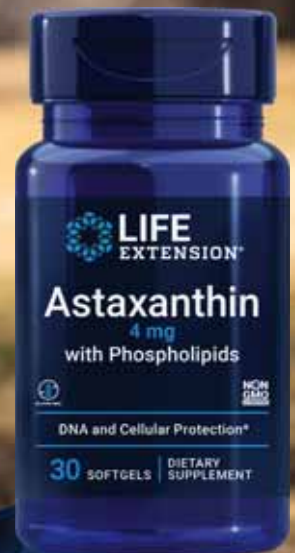
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Life Extension® combines **4 mg** of **astaxanthin** with a blend of four different **phospholipids**, which has been shown to enhance carotenoid **absorption** by **several-fold**.⁴

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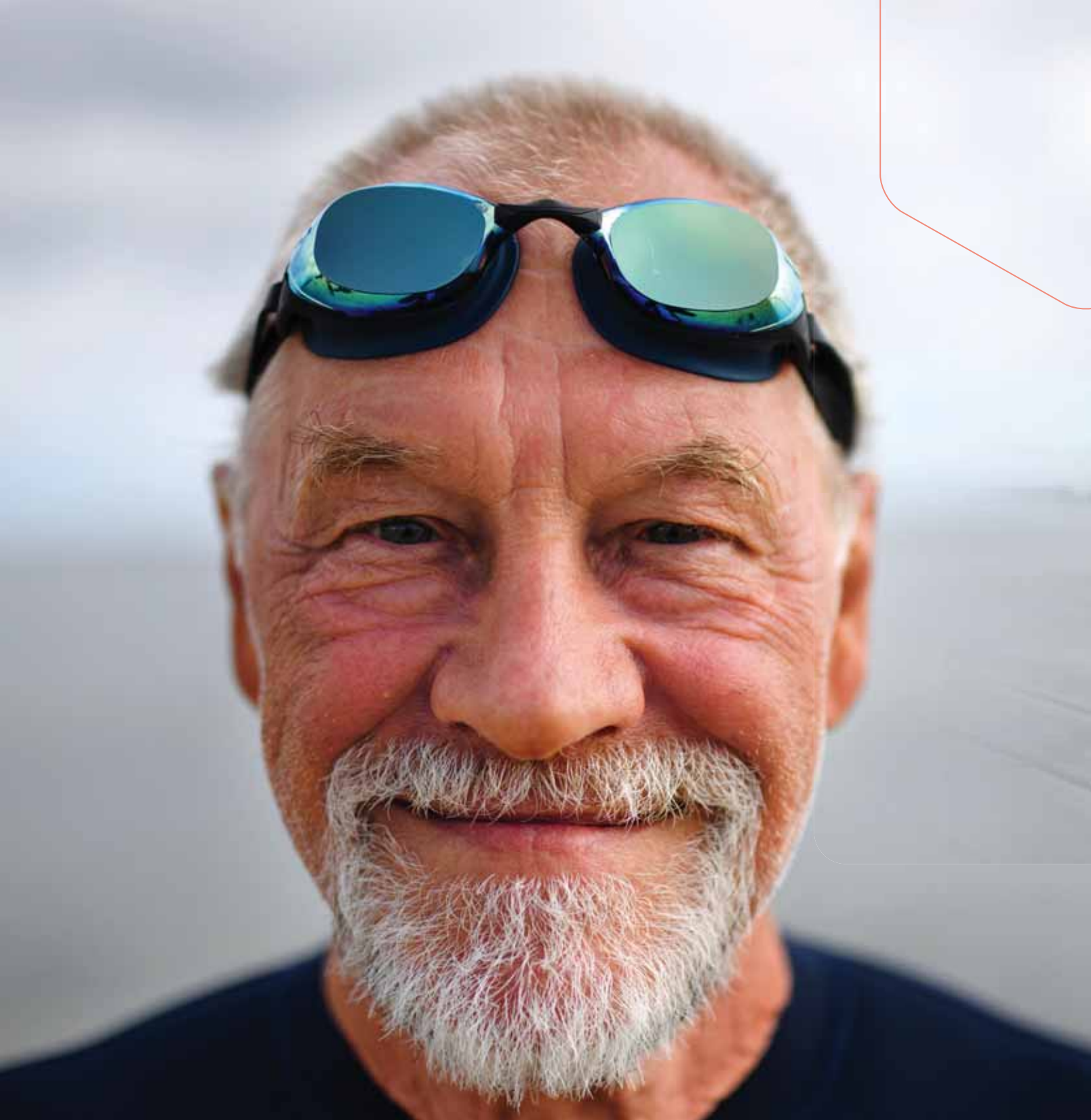
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MOTIVATION MATTERS for Longer Life



BY PAUL McGLOTHIN

Preventing **age-related decline** is challenging. Getting enough exercise and ensuring proper food and nutrient selection are vital.

But keeping this up consistently also requires a personal characteristic: **motivation**. If you aren't motivated to slow the rate at which you **age**, you will fade away.

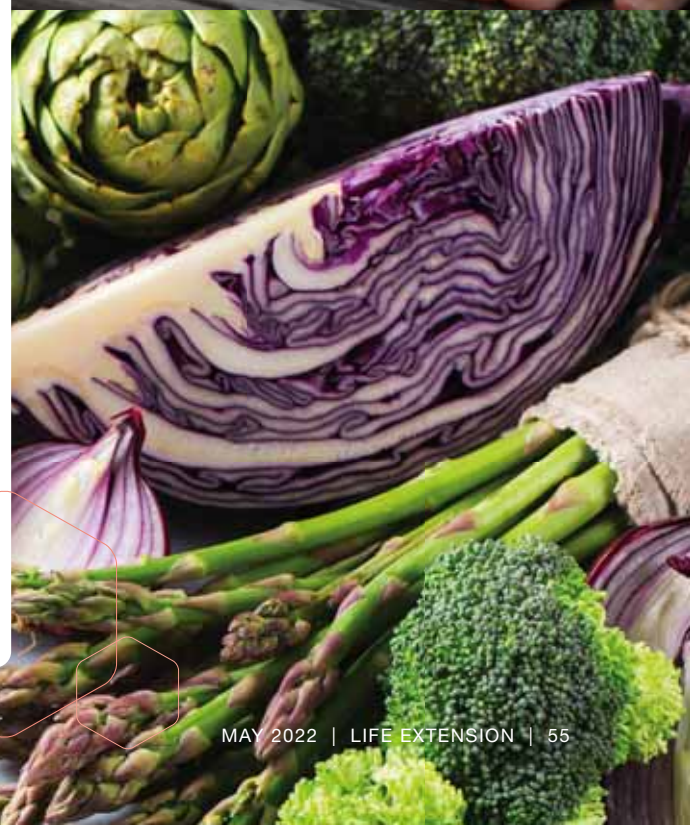
The brilliant brain researcher Ann M. Graybiel and her colleagues have shed some light recently on why motivation can wane as people age.¹ They found that the **brain circuit** that governs motivation *declines* with age, at least in mice.

That seems to happen to some people too. They initially proclaim a strong commitment to slow their rate of aging yet lose their zeal as the years roll by.

But not everyone.

Some stand out and continue to maintain their motivation in their later decades.

What sets them apart?



Lifelong Motivation

To answer this question about motivation, my partner, Meredith Averill, and I looked for **centenarian role models** who were motivated to embrace the aging challenges they faced—and to *overcome* them.

One of them is Ralph Cornell.

Back in 2008, Meredith and I published *The CR Way*, our guide to how **calorie restriction** can improve health and extend lifespan.

We were lucky to have had Ralph as a mentor.

Ralph was a happy centenarian from the heartland town of Massillon, Ohio, who lived to 104.

Staying Positive

One of the keys to staying motivated is finding **joy** in life.

He was unfailingly **optimistic**. Even during his last months, he was motivated to plan diet and lifestyle changes with the hope of living to 112, the age of Ohio's oldest person at the time. Ralph was still working too, having been honored on NBC's *Today* as the oldest living realtor in the U.S.

Meredith and I had the privilege of celebrating several Thanksgivings with Ralph. Before we would start our Thanksgiving dinner, he would often say a few words that included how happy he was to continue experiencing life.



Ralph Cornell at 103 years of age.

Ralph also had a deep **passion for living**. This is a characteristic we have observed in *everyone* who maintains their motivation to optimize health when they are advanced in age.

Although he did not have a scientific or medical background, he figured out a natural way to extend his life through what's come to be known as **intermittent fasting**.

He also practiced **hara hachi bu**. A Japanese phrase meaning “eat until you're **80%** full,” this practice was developed by long-lived Okinawans who stopped eating when they began to feel full.

It was inspiring to spend time with Ralph and to adapt ideas from *his* natural approach to longer life to our own philosophy.

Community Support

It's hard to stay motivated on your own. As the CR Way has progressed, we've developed a **support group**. Members can come together by telephone and share their aging successes *and* challenges.

The support group provides some of the same personal interaction and support that we got from being with Ralph.

Everyone benefits from hearing how others achieve their goals and what holds them back. And when someone encounters a challenge, the group is ready to pitch in and help them solve it.

Finding Fun in Food

Eating right doesn't have to be a chore. We recently held a class on making healthy foods irresistible while *motivating* ourselves to look forward to the taste treats that meals provide.

It's important to plan healthful meals with interesting tastes and textures that delight you. While varying dietary intake is fun, it is also important for a healthy **gut microbiota**,^{2,3} which has been associated with positive emotions.^{4,5}

Your gut microbiota changes rapidly to adapt to the foods you eat. Enjoying a variety of raw and cooked vegetables helps make your microbiota more diverse.⁶

This morning I began my day with a **Farmers' Market Soup** made from a variety of fresh vegetables from a local organic farmer. The vegetables combine to make a rich, savory taste and their contrasting textures add interest.

It's delicious, *and* it is wonderful to know that the benefits of eating this way—better **glucose control** and a cardiovascular system that functions as if I were much younger⁷—will help me feel good all day.

Here's a recipe for the **CR Way Farmers' Market Soup**. The idea is to make it easy to enjoy a healthy variety of vegetables and sprouts in your diet, to develop a more diverse gut microbiome, and to have fun doing it.



Farmers' Market Soup*

Use this recipe as a template for a delicious soup made from the vegetables you get from an organic farmer. Substitute or add veggies you prefer.

One 115-gram serving, 23 Cal.
per serving. Prep time: 4 minutes

20 grams	One large leaf of kale, chopped to bite size
10 grams	Two green onions, chopped
15 grams	A few tablespoons mixed sprouts (Sprout Lady Rita)
50 grams	One stalk wild celery, chopped
20 grams	Fresh microgreen mix, your choice of amount

Directions:

Add $\frac{3}{4}$ pint to 1 pint water to a saucepan.
Add all the ingredients.
Bring to a boil and cook for two minutes.
Serve in your favorite soup bowl with walnuts, as desired.

* P. McGlothlin & M. Averill. *The CR Way to Great Glucose Control*, 2020.

This recipe can be changed on a regular basis, throughout the year, to include other fresh, organic ingredients that are in season.

WHAT
YOU
NEED
TO
KNOW

The Key to a Healthier Life

- To continue to live a healthy life well into older age, it's vital to stay **motivated**.
- There are a few key ways to achieve this. Being positive and passionate about life, finding support in a community, making healthy foods as tasty and fresh as possible, and getting enough sleep are just a few.
- Many people who have lived to be **100 years old** or more live by these tenets.



Contributing to the Greater Good

Another level of emotional satisfaction from eating this way is the joy of contributing to a better community.

By purchasing from a local organic farmer that we know and trust, we help a deserving person who works long, dedicated hours and does everything possible to preserve the land that their farm is on. We want to lend our support to people like that whose work makes a better community for everyone.

Unhealthy comfort foods may provide short-term pleasure, but they will increase your risk of age-related disease and shorten the time you have to spend enjoying this planet. Eating delicious, healthy meals will likely make it possible for you to enjoy the things you love far longer.

Long and Satisfying Sleep

Staying motivated takes energy. Every successful ager we have known **sleeps** as well as people in their 20s or 30s.

Sleep quality is often reported to decline with age.⁸ But it doesn't have to be that way. Strategies for better sleep are part of the *CR Way to Great Glucose Control*, the starter course for CR Way living.

Simply setting your **circadian clock** by walking outdoors in the early morning sunlight and at sunset⁹ is a good start toward getting better sleep. It can also increase mood-elevating neurotransmitters like **serotonin**¹⁰ and **dopamine**¹¹ and help you manage glucose levels more effectively.¹²

Emotional Empowerment

Satisfying sleep, delicious food, a healthy gut, and community support are all part of an approach to help people be happy naturally.

Happiness empowers you to make healthy lifestyle choices because you experience how good it feels to optimize your health. We encourage people to consult with doctors before embarking on major lifestyle or diet changes.

As I write this article, I'm looking out my window at the sun glistening off leaves of the trees in the woods. It's a beautiful day, the kind of day I hope to enjoy again and again. I can hardly wait to walk outside and set my circadian clock.

No one can predict the future, but I know that I'm grateful for what I have and imagine that you are grateful for the things you enjoy, too. If you have



read this article, it's likely you are motivated to make the effort to enjoy your life for as long as possible. It's worth it. •

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

About The CR Way

Paul McGlothlin and **Meredith Averill** wrote *The CR Way* (HarperCollins, 2008) based on decades of research showing that diet and lifestyle can produce favorable changes in genes and other aging biomarkers. They later created the online community Living the CR Way.

They are currently collaborating with scientists at Harvard Medical School and The Forsyth Institute (supported by Zymo Research) to focus on the immune system, microbiome composition, and DNA methylation as gauges of aging interventions.

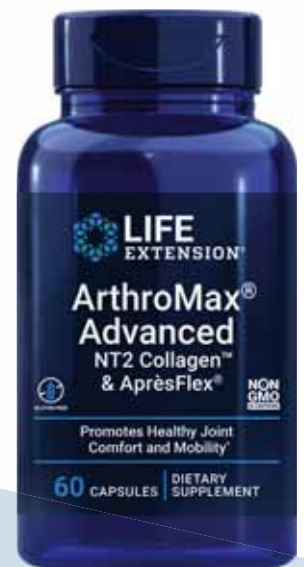
To learn more about the authors and the CR Way, call 877-481-4841 or visit www.livingthecrway.com.

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

Item #02238 • 60 capsules
1 bottle **\$25.50**

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[‡] 3-O-acetyl-11-ketoB-boswellic acid.

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This **5 mg** potency exceeds the **L-ergothioneine** contained in 2 cups of white button mushrooms, depending on growing conditions.^{4,5}

References

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VITAMIN K

BY LAURIE MATHENA



Vitamin K is best known for helping blood clot properly and for maintaining bone density.

Research continues to uncover its broad array of benefits.

Studies have been published showing that both forms of vitamin K—**K1** and **K2**—can impact everything from heart disease risk to cognitive function to all-cause mortality.

Here are the highlights:

- **Low vitamin K status raises all-cause mortality risk.**

A meta-analysis published in the *American Journal of Clinical Nutrition* that included 3,891 participants with an average **age of 65**, found that people with *low* levels of circulating vitamin K1 (**0.5 nmol/L or lower**) had a **19% higher** risk of **all-cause mortality** compared to those with levels **more than 1.0 nmol/L**.¹

- **Higher intake of vitamin K2 lowers coronary heart disease risk.**

In a study published in *BMJ Open*, researchers followed 2,987 people between 46-49 years old, for up to 11 years. After adjusting for factors like age, sex, and physical activity, they found that a *higher* dietary intake of **vitamin K2** was associated with a *lower* risk of **coronary heart disease**.²

- **Lower vitamin K levels linked to fracture risk.**

Researchers evaluated the associations between circulating vitamin K1 levels, fracture risk, and bone mineral density in postmenopausal women with osteoporosis. They found that vitamin K1 levels were significantly lower in the women who had suffered a fracture, and that vitamin K levels were independently associated with fracture risk. They also determined vitamin K's impact on fracture risk may be related to its effects on bone strength.³

In another study, researchers followed 12,794 people from 40 to 74 years old and found that lower intakes of vitamin K and calcium in women were associated with a higher risk of **vertebral fractures**.⁴

- **Vitamin K status significant for better cognition in older adults.**

In a study that included 500 older adults, researchers found that people with better cognition had significantly *higher* levels of dietary **vitamin K1** than people with the poorest cognitive function. Both dietary and serum levels of vitamin K1 were independent predictors of good cognitive function.⁵

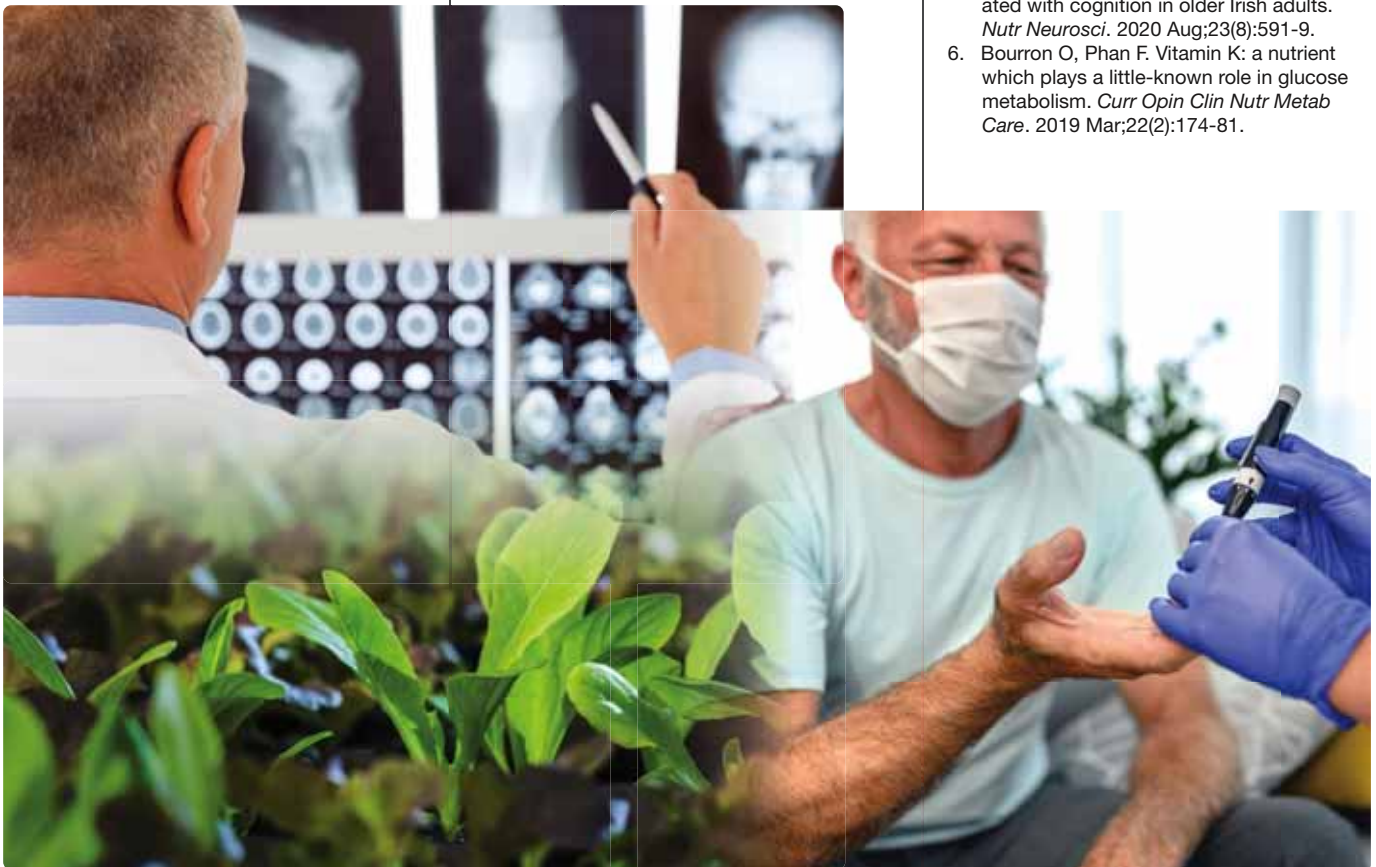
- **Vitamin K helps reduce risk of type II diabetes.**

There's also growing evidence that *higher* intake and blood levels of **vitamin K** (in the form of both **K1** and **K2**) are substantially associated with reduced risks of developing type II diabetes.⁶ •

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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Item # 01630 • 120 vegetarian capsules

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HEALTHY BONES = HEALTHY HEART



THREE WAYS TO GET VITAMIN



MEGA VITAMIN K2

Japanese physicians use *high-dose vitamin K2* for those with challenges in maintaining healthy bone density. **Mega Vitamin K2** costs **86 cents** a day, based on the 4-bottle price, and provides in one daily capsule:

Vitamin K2 (MK-4) 45,000 mcg
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"I have been using this for bone building, and my bone density tests have improved."

Dolores

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SUPER K ELITE

Super K Elite provides 2 additional forms of vitamin K and even *higher* potencies of K1, MK4, and MK7. **Super K Elite** costs **54 cents** a day, based on the 4-bottle price, and provides in one softgel:

Vitamin K1 2,000 mcg
(converts to K2 in some people)

Vitamin K2 (MK-4) 1,500 mcg
(for bone & vascular health)

Vitamin K2 (MK-7) 181 mcg
(long-acting protection)

Vitamin K2 (MK-9) 43 mcg
(added cardiovascular support)

Vitamin K2 (MK-6) 11 mcg
(added cardiovascular support)



1
DAILY

SUPER K ELITE Item #02335 • 30 softgels
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SUPER K is the best-selling **vitamin K** formula for bone and heart health. It costs only **23 cents** a day, based on the 4-bottle price, and provides in one softgel:

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Vitamin K2 (MK-4) 1,000 mcg
(for bone & vascular health)

Vitamin K2 (MK-7) 100 mcg
(long-acting protection)



1
DAILY

SUPER K Item #02334 • 90 softgels
1 bottle **\$22.50** • 4 bottles \$20.25 each

For full product description and to order these **VITAMIN K** formulas call **1-800-544-4440** or visit www.LifeExtension.com

CAUTION: If you are taking a vitamin K antagonist (e.g. warfarin), consult your healthcare practitioner before taking this product.



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- Advanced Treatment Strategies

What are Branched Chain Amino Acids?

BY LAURIE MATHENA



Branched chain amino acids (BCAAs) help with the maintenance of muscle tissue.

They are called “essential” because your body doesn’t make them, which means you need to obtain them through diet or supplementation.

Branched chain amino acids could play a role in preventing **age-related muscle loss**, which is a leading cause of injury and long-term disability among older adults.¹

The Dangers of Muscle Loss

Sarcopenia is the progressive loss of muscle mass and strength that occurs with age. It is estimated to occur in more than **15%** of older adults in the U.S.² This increases the risk of falls, injuries, and loss of functional capacity.

Compared to those without the condition, individuals with sarcopenia are:

- At more than **70%** higher risk of fracture³
- **1.5 to 4.6 times** more likely be disabled⁴
- Twice as likely to be hospitalized⁵
- At a **37%** higher mortality rate⁶

Other conditions associated with sarcopenia include insulin resistance and increased risk for cardiovascular disease, non-alcoholic fatty liver disease, arterial stiffness, and hypertension.⁷

Supplementation with **branched chain amino acids** can help mitigate age-related muscle loss.

Support Healthy Muscle Mass

Amino acids are the building blocks of protein. Nine of the 20 amino acids required for protein synthesis in humans are considered “essential,” and three of those essential amino acids are called **branched chain amino acids (BCAAs)**.

The three BCAAs account for **35%** of the essential amino acids in muscle proteins.⁸

BCAAs help with the maintenance and growth of skeletal muscle, and they serve as an energy source for muscle tissue during exercise.

In one randomized, double-blind, placebo-controlled study, BCAA supplementation was shown to reduce muscle-related soreness after exercise and accelerate muscle recovery, compared to placebo.⁹ A meta-analysis of eight studies further supports this finding.¹⁰

Research suggests that to maintain healthy muscle tissue, aging adults often require more protein than younger adults.¹¹

Supplementing with BCAAs offers a promising way to support healthy muscle maintenance and may reduce the risk of age-related muscle loss.

Since your body doesn’t produce these essential BCAAs, it’s necessary to obtain them through diet or supplementation. •

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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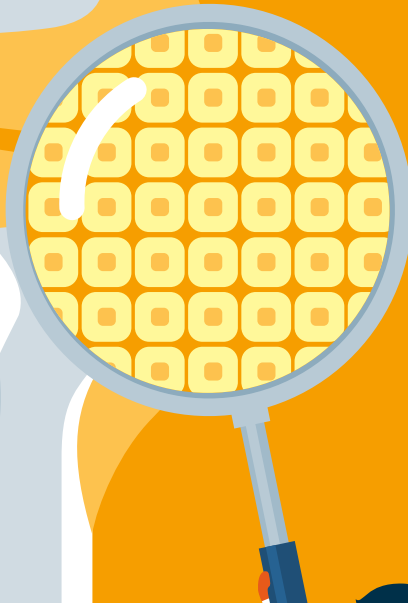
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BCAAs are not produced by the body and are considered **essential**.

In one clinical study, **BCAA** supplementation was shown to reduce muscle-related soreness and accelerate muscle recovery, compared to placebo.³



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References: 1. *Nutrition*. 2017;42:30-36. 2. *Amino Acids*. 2016;48(3):779-789. 3. *J Int Soc Sports Nutr*. 2012;9:20..

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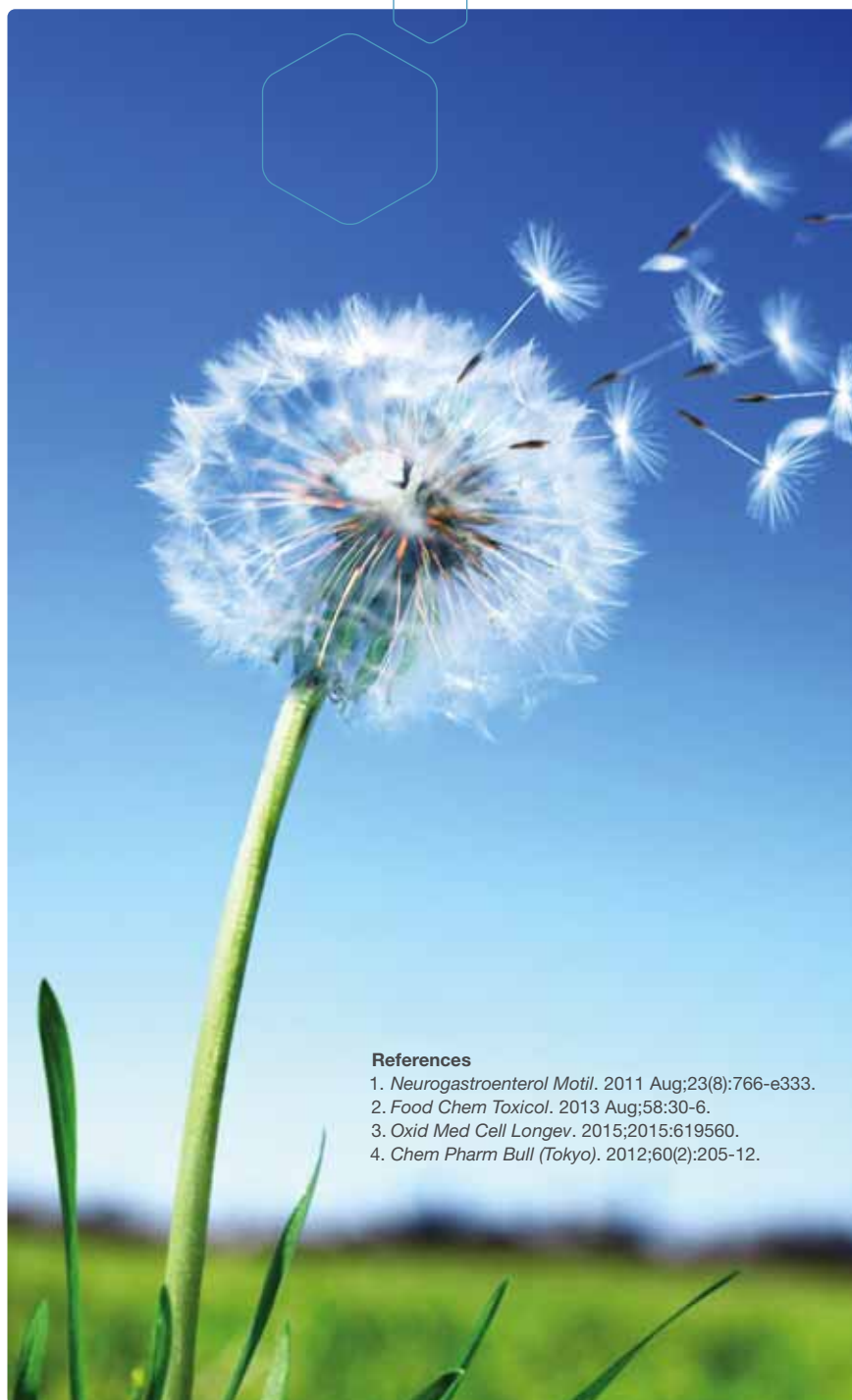
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Dandelion

BY LAURIE MATHENA



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Dandelions are notorious for invading our yards every summer. But these pesky weeds are as nutritious as any vegetable growing in your garden.

Traditional medicine practices have been using dandelions for thousands of years to treat ailments ranging from acne to liver disease to digestive disorders.

Every part of a dandelion—the root, stem, and flower—is packed with nutrients that provide myriad health benefits.

The **root** is a good source of soluble fiber that helps support healthy gut bacteria.

The **flowers** contain polyphenols, which are plant compounds that could potentially help prevent blood clots, reduce blood sugar levels, and lower heart disease risk.

Animal studies have shown that dandelions may help combat constipation by increasing stomach contractions and the rate of emptying the stomach contents into the small intestine.¹

In another study, mice treated with dandelion extract experienced dramatically reduced **cholesterol** and **triglyceride** levels.²

Cell culture studies suggest dandelion extracts are also great for your skin.

Dandelion **leaf** and **flower extracts** have been shown to protect skin cells exposed to ultraviolet irradiation.³

And dandelion **root extract** can increase the generation of new skin cells, *which slows skin aging*.⁴

Dandelions are most often consumed as a supplement or tea. They are also safe to consume raw or cooked. •

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- 02024 Triple Action Blood Pressure AM/PM
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- 01725 Bone Strength Collagen Formula
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- 01963 Calcium Citrate with Vitamin D
- 01506 Dr. Strum's Intensive Bone Formula
- 02417 Mega Vitamin K2
- 01476 Strontium Caps

BRAIN HEALTH

- 01524 Acetyl-L-Carnitine
- 01974 Acetyl-L-Carnitine Arginate
- 02419 B12 Elite
- 02510 Brain Fog Relief
- 01659 CDP Choline
- 02321 Cognitex® Basics
- 02396 Cognitex® Elite
- 02397 Cognitex® Elite Pregnenolone
- 01540 DMAE Bitartrate
- 02006 Dopa-Mind™
- 02413 Dopamine Advantage
- 02212 Focus Tea™
- 01658 Ginkgo Biloba Certified Extract™
- 01527 Huperzine A
- 00020 Lecithin
- 02101 Memory Protect

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

CHOLESTEROL MANAGEMENT

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

DIGESTION SUPPORT

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

ENERGY MANAGEMENT

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

EYE HEALTH

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

FISH OIL & OMEGAS

- 01937 Mega EPA/DHA
- 02218 Mega GLA Sesame Lignans
- 01983 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 60 softgels
- 01988 Super Omega-3 Plus EPA/DHA Fish Oil, Sesame Lignans, Olive Extract, Krill & Astaxanthin
- 01982 Super Omega-3 EPA/DHA Fish Oil, Sesame Lignans & Olive Extract • 120 softgels

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

FOOD

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

GLUCOSE MANAGEMENT

- 01503 CinSulin® with InSea²® and Crominex® 3+
- 01620 CoffeeGenic® Green Coffee Extract
- 02122 Glycemic Guard™
- 00925 Mega Benfotiamine
- 01803 Tri Sugar Shield®

HEART HEALTH

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

HORMONE BALANCE

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

IMMUNE SUPPORT

- 024115 Day Elderberry Immune
- 00681 AHCC®
- 02302 Bio-Quercetin®
- 02410 Black Elderberry + Vitamin C
- 01961 Enhanced Zinc Lozenges
- 01704 Immune Modulator with Tinofend®
- 02425 Immune Packs with Vitamin C & D, Zinc and Probiotic

- 02005 Immune Senescence Protection Formula™
- 00316 Kyolic® Garlic Formula 102
- 00789 Kyolic® Reserve
- 01681 Lactoferrin (Apolactoferrin) Caps
- 02426 Mushroom Immune with Beta Glucans
- 01903 NK Cell Activator™
- 01394 Optimized Garlic
- 01309 Optimized Quercetin
- 01811 Peony Immune
- 00525 ProBoost Thymic Protein A
- 01708 Reishi Extract Mushroom Complex
- 01906 Standardized Cistanche
- 13685 Ten Mushroom Formula®
- 01097 Ultra Soy Extract
- 01561 Zinc Lozenges

INFLAMMATION MANAGEMENT

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

JOINT SUPPORT

- 02404 Arthro-Immune Joint Support
- 02238 ArthroMax® Advanced NT2 Collagen™ & AprèsFlex®
- 01617 ArthroMax® with Theaflavins & AprèsFlex®
- 02138 ArthroMax® Elite
- 00965 Fast-Acting Joint Formula
- 02430 Fast Acting Relief
- 00522 Glucosamine/Chondroitin Capsules
- 02420 Glucosamine Sulfate
- 02424 Joint Mobility
- 01600 Krill Healthy Joint Formula
- 01050 Krill Oil
- 00451 MSM (Methylsulfonylmethane)
- 02231 NT2 Collagen™

KIDNEY & BLADDER SUPPORT

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

LIVER HEALTH & DETOXIFICATION

- 01922 Advanced Milk Thistle • 60 softgels
- 01925 Advanced Milk Thistle • 120 softgels
- 02240 Anti-Alcohol Complex
- 01651 Calcium D-Glucarate
- 01571 Chlorophyllin
- 01522 Milk Thistle • 60 veg capsules
- 02402 FLORASSIST® Liver Restore™
- 01541 Glutathione, Cysteine & C
- 01393 HepatoPro
- 01608 Liver Efficiency Formula
- 01534 N-Acetyl-L-Cysteine
- 00342 PectaSol-C® Modified Citrus Pectin Powder
- 01080 PectaSol-C® Modified Citrus Pectin Capsules
- 01884 Silymarin
- 02361 SOD Booster

LONGEVITY & WELLNESS

- 00457 Alpha-Lipoic Acid
- 01625 AppleWise
- 02414 Bio-Fisetin
- 01214 Blueberry Extract
- 01438 Blueberry Extract and Pomegranate
- 02270 DNA Protection Formula
- 02405 Endocannabinoid System Booster
- 02431 Essential Youth - L-Ergothioneine
- 02119 GEROPROTECT® Ageless Cell™
- 02415 GEROPROTECT® Autophagy Renew
- 02133 GEROPROTECT® Longevity A.I.™
- 02401 GEROPROTECT® Stem Cell
- 02211 Grapeseed Extract
- 00954 Mega Green Tea Extract (decaffeinated)
- 00953 Mega Green Tea Extract (lightly caffeinated)
- 01513 Optimized Fucoidan with Maritech® 926
- 02230 Optimized Resveratrol
- 01637 Pycnogenol® French Maritime Pine Bark Extract
- 02210 Resveratrol
- 00070 RNA (Ribonucleic Acid)
- 02301 Senolytic Activator®
- 01208 Super R-Lipoic Acid
- 01919 X-R Shield

MEN'S HEALTH

- 02209 Male Vascular Sexual Support
- 00455 Mega Lycopene Extract
- 02306 Men's Bladder Control
- 01789 PalmettoGuard® Saw Palmetto and Beta-Sitosterol
- 01790 PalmettoGuard® Saw Palmetto/Nettle Root Formula and Beta-Sitosterol
- 01837 Pomi-T®
- 01373 Prelox® Enhanced Sex for Men
- 01940 Super MiraForte with Standardized Lignans
- 02500 Testosterone Elite
- 01909 Triple Strength ProstaPollen™
- 02029 Ultra Prostate Formula

MINERALS

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

MISCELLANEOUS

- 00577 Potassium Iodide
- 00657 Solarshield® Sunglasses

MOOD & STRESS MANAGEMENT

- 02312 Cortisol-Stress Balance
- 00987 Enhanced Stress Relief
- 01074 5 HTP
- 01683 L-Theanine
- 02175 SAmE (S-Adenosyl-Methionine)
200 mg, 30 enteric coated vegetarian tablets
- 02176 SAmE (S-Adenosyl-Methionine)
400 mg, 30 enteric coated vegetarian tablets

- 02174 SAmE (S-Adenosyl-Methionine)
400 mg, 60 enteric coated vegetarian tablets
- 02429 Theanine XR™ Stress Relief

MULTIVITAMINS

- 02199 Children's Formula Life Extension Mix™
- 02354 Life Extension Mix™ Capsules
- 02364 Life Extension Mix™ Capsules without Copper
- 02356 Life Extension Mix™ Powder
- 02355 Life Extension Mix™ Tablets
- 02357 Life Extension Mix™ Tablets with Extra Niacin
- 02365 Life Extension Mix™ Tablets without Copper
- 02292 Once-Daily Health Booster • 30 softgels
- 02291 Once-Daily Health Booster • 60 softgels
- 02313 One-Per-Day Tablets
- 02428 Plant-Based Multivitamin
- 02317 Two-Per-Day Capsules • 60 capsules
- 02314 Two-Per-Day Capsules • 120 capsules
- 02316 Two-Per-Day Tablets • 60 tablets
- 02315 Two-Per-Day Tablets • 120 tablets

NERVE & COMFORT SUPPORT

- 02202 ComfortMAX™
- 02303 Discomfort Relief

PERSONAL CARE

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

PET CARE

- 01932 Cat Mix
- 01931 Dog Mix

PROBIOTICS

- 01622 Bifido GI Balance
- 01825 FLORASSIST® Balance
- 02421 FLORASSIST® Daily Bowel Regularity
- 02125 FLORASSIST® GI with Phage Technology
- 01821 FLORASSIST® Heart Health
- 02250 FLORASSIST® Mood Improve
- 02208 FLORASSIST® Immune & Nasal Defense
- 02120 FLORASSIST® Oral Hygiene
- 02203 FLORASSIST® Prebiotic
- 01920 FLORASSIST® Throat Health
- 02400 FLORASSIST® Winter Immune Support
- 52142 Jarro-Dophilus® for Women
- 00056 Jarro-Dophilus EPS® • 60 veg capsules
- 21201 Jarro-Dophilus EPS® • 120 veg capsules
- 01038 Theralac® Probiotics
- 01389 TruFlora® Probiotics

SKIN CARE

- 80157 Advanced Anti-Glycation Peptide Serum
- 80165 Advanced Growth Factor Serum
- 80170 Advanced Hyaluronic Acid Serum
- 80154 Advanced Lightening Cream
- 80155 Advanced Peptide Hand Therapy
- 80175 Advanced Probiotic-Fermented Eye Serum
- 80177 Advanced Retinol Serum
- 80152 Advanced Triple Peptide Serum
- 80140 Advanced Under Eye Serum with Stem Cells
- 80137 All-Purpose Soothing Relief Cream
- 80139 Amber Self MicroDermAbrasion

- 80118 Anti-Aging Mask
- 80151 Anti-Aging Rejuvenating Face Cream
- 80153 Anti-Aging Rejuvenating Scalp Serum
- 80179 Brightening Peptide Serum
- 80176 Collagen Boosting Peptide Cream
- 80156 Collagen Boosting Peptide Serum
- 02408 Collagen Peptides for Skin & Joints
- 80180 CoQ10 and Stem Cell Rejuvenation Cream
- 80169 Cucumber Hydra Peptide Eye Cream
- 02423 Daily Skin Defense
- 80141 DNA Support Cream
- 80163 Eye Lift Cream
- 80123 Face Rejuvenating Anti-Oxidant Cream
- 80109 Hyaluronic Facial Moisturizer
- 80110 Hyaluronic Oil-Free Facial Moisturizer
- 80138 Hydrating Anti-Oxidant Facial Mist
- 00661 Hydroderm
- 55495 Instensive Moisturizing Cream
- 80103 Lifting & Tightening Complex
- 80168 Melatonin Advanced Peptide Cream
- 80114 Mild Facial Cleanser
- 80172 Multi Stem Cell Hydration Cream
- 80159 Multi Stem Cell Skin Tightening Complex
- 80122 Neck Rejuvenating Anti-Oxidant Cream
- 80174 Purifying Facial Mask
- 80150 Renewing Eye Cream
- 80142 Resveratrol Anti-Oxidant Serum
- 01938 Shade Factor™
- 02129 Skin Care Collection Anti-Aging Serum
- 02130 Skin Care Collection Day Cream
- 02131 Skin Care Collection Night Cream
- 80166 Skin Firming Complex
- 02096 Skin Restoring Ceramides
- 80130 Skin Stem Cell Serum
- 80164 Skin Tone Equalizer
- 80143 Stem Cell Cream with Alpine Rose
- 80148 Tightening & Firming Neck Cream
- 80161 Triple-Action Vitamin C Cream
- 80162 Ultimate MicroDermabrasion
- 80173 Ultimate Peptide Serum
- 80178 Ultimate Telomere Cream
- 80160 Ultra Eyelash Booster
- 80101 Ultra Wrinkle Relaxer
- 80113 Under Eye Refining Serum
- 80104 Under Eye Rescue Cream
- 80171 Vitamin C Lip Rejuvenator
- 80129 Vitamin C Serum
- 80136 Vitamin D Lotion
- 80102 Vitamin K Cream

SLEEP

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

- 01788 Melatonin 6 Hour Timed Release
750 mcg, 60 veg tablets
- 01786 Melatonin 6 Hour Timed Release 3 mg, 60 veg tablets
- 01721 Optimized Tryptophan Plus
- 01444 Quiet Sleep
- 01445 Quiet Sleep Melatonin
- 02502 Rest & Renew

VITAMINS

- 01533 Ascorbyl Palmitate
- 00920 Benfotiamine with Thiamine
- 00664 Beta-Carotene
- 01945 BioActive Complete B-Complex
- 00102 Biotin
- 00084 Buffered Vitamin C Powder
- 02229 Fast-C® and Bio-Quercetin Phytosome
- 02075 Gamma E Mixed Tocopherol Enhanced with
Sesame Lignans
- 02070 Gamma E Mixed Tocopherol & Tocotrienols
- 01913 High Potency Optimized Folate
- 01674 Inositol Caps
- 02244 Liquid Vitamin D3 • 50 mcg (2000 IU)
- 02232 Liquid Vitamin D3 (Mint) • 50 mcg (2000 IU)
- 01936 Low-Dose Vitamin K2
- 00065 MK-7
- 00373 No Flush Niacin
- 01939 Optimized Folate (L-Methylfolate)
- 01217 Pyridoxal 5'-Phosphate Caps
- 01400 Super Absorbable Tocotrienols
- 02334 Super K
- 02335 Super K Elite
- 01863 Super Vitamin E
- 02422 Vegan Vitamin D3
- 02028 Vitamin B5 (Pantothenic Acid)
- 01535 Vitamin B6
- 00361 Vitamin B12 Methylcobalamin
- 01536 Vitamin B12 Methylcobalamin • 1 mg, 60 veg lozenges
- 01537 Vitamin B12 Methylcobalamin • 5 mg, 60 veg lozenges
- 02228 Vitamin C and Bio-Quercetin Phytosome • 60 veg tablets
- 02227 Vitamin C and Bio-Quercetin Phytosome • 250 veg tablets
- 01753 Vitamin D3 • 25 mcg (1000 IU), 90 softgels
- 01751 Vitamin D3 • 25 mcg (1000 IU), 250 softgels
- 01713 Vitamin D3 • 125 mcg (5000 IU), 60 softgels
- 01718 Vitamin D3 • 175 mcg (7000 IU), 60 softgels
- 01758 Vitamin D3 with Sea-Iodine™
- 02040 Vitamins D and K with Sea-Iodine™

WEIGHT MANAGEMENT & BODY COMPOSITION

- 02479 7-Keto® DHEA Metabolite • 100 mg, 60 veg capsules
- 01807 Advanced Appetite Suppress
- 02207 AMPK Metabolic Activator
- 02504 Body Trim and Appetite Control
- 02478 DHEA Complete
- 01738 Garcinia HCA
- 01908 Mediterranean Trim with Sinetrol™ -XPur
- 01432 Optimized Saffron
- 00818 Super CLA Blend with Sesame Lignans
- 02509 Waistline Control™

WOMEN'S HEALTH

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



NEURO-MAG[®] THE SMART MAGNESIUM

Supports Improvement in Overall Cognitive Ability*



Neuro-Mag[®] Magnesium L-Threonate was specifically formulated by MIT scientists to be uniquely absorbable by brain and nerve cells.

The number of **synapses** that connect brain cells decline with aging.

Magnesium L-Threonate has been shown to improve **synaptic density** and other structural components of the brain.*



Item #01603 • 90 vegetarian capsules
1 bottle \$30 • 4 bottles \$27 each



Item #02032 • 93.35 grams of powder
1 jar \$28.50 • 4 jars \$26 each

For full product description and to order **Neuro-Mag[®] Magnesium L-Threonate** or **Neuro-Mag[®] Magnesium L-Threonate Powder**, call 1-800-544-4440 or visit www.LifeExtension.com

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

Magtein[®] is a registered trademark of Magceutics, Inc. and is distributed exclusively by AIDP, Inc. Magtein[®] is protected under U.S. patents 8,178,118; 8,142,803; 8,163,301 and other patents pending.

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

**HIGHLY
PURIFIED**

"It has my joints
feeling well."

Anthony

VERIFIED CUSTOMER REVIEW

FISH OIL



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



SUPER OMEGA-3 PLUS

EPA/DHA Fish Oil, Sesame Lignans,
Olive Extract, Krill & Astaxanthin
(2,520 mg of EPA + DHA in four softgels)

SUPER OMEGA-3*

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

Item #01988 • 120 softgels
1 bottle **\$34.50** • 4 bottles \$32 each



Item #01982 • 120 softgels
1 bottle **\$24.75** • 4 bottles \$22 each

For full product description and to order **Super Omega-3**, or **Super Omega-3 Plus**,
call **1-800-544-4440** or visit www.LifeExtension.com

CAUTION: If you are taking anti-coagulant or anti-platelet medications, or have a bleeding disorder, consult your healthcare provider before taking this product.

* Highest Independent 5-star rating, International Fish Oil Society For Over Nine Years. IFOS™ certification mark is a registered trademark of Nutrasource Diagnostics, Inc.

These products have been tested to the quality and purity standards of the IFOS™ program conducted at Nutrasource Diagnostics, Inc.

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



IN THIS EDITION OF *LIFE EXTENSION* MAGAZINE®



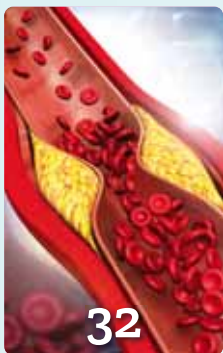
7 A CURABLE VIRUS THAT CAN CAUSE CANCER

Hepatitis C is a major cause of liver failure and liver cancer. A simple **blood test** provides *early* warning against this silent, but **curable** disease.



22 TARGET BELLY FAT

Two **plant extracts** *reduced* **waist circumference** by an average of **4.7 inches** and **hip size** by an average of **4.1 inches** in clinical trials.



32 OVERLOOKED RISKS OF ELEVATED HOMOCYSTEINE

Elevated **homocysteine** blood levels contribute to brain aging, heart disease, and hearing loss.



42 REVERSE NONALCOHOLIC FATTY LIVER DAMAGE

A blend of **probiotics** and a **prebiotic** has been clinically shown to *stop* progression of **nonalcoholic fatty liver disease** and help *reverse* liver damage.



63 VITAMIN K RESEARCH UPDATE

Recent studies show how **vitamin K** impedes arterial calcification and reduces all-cause mortality.



69 WHAT ARE BRANCHED CHAIN AMINO ACIDS?

Age-related muscle loss causes frailty and injuries among older adults. **Branched chain amino acids** help support muscle mass.