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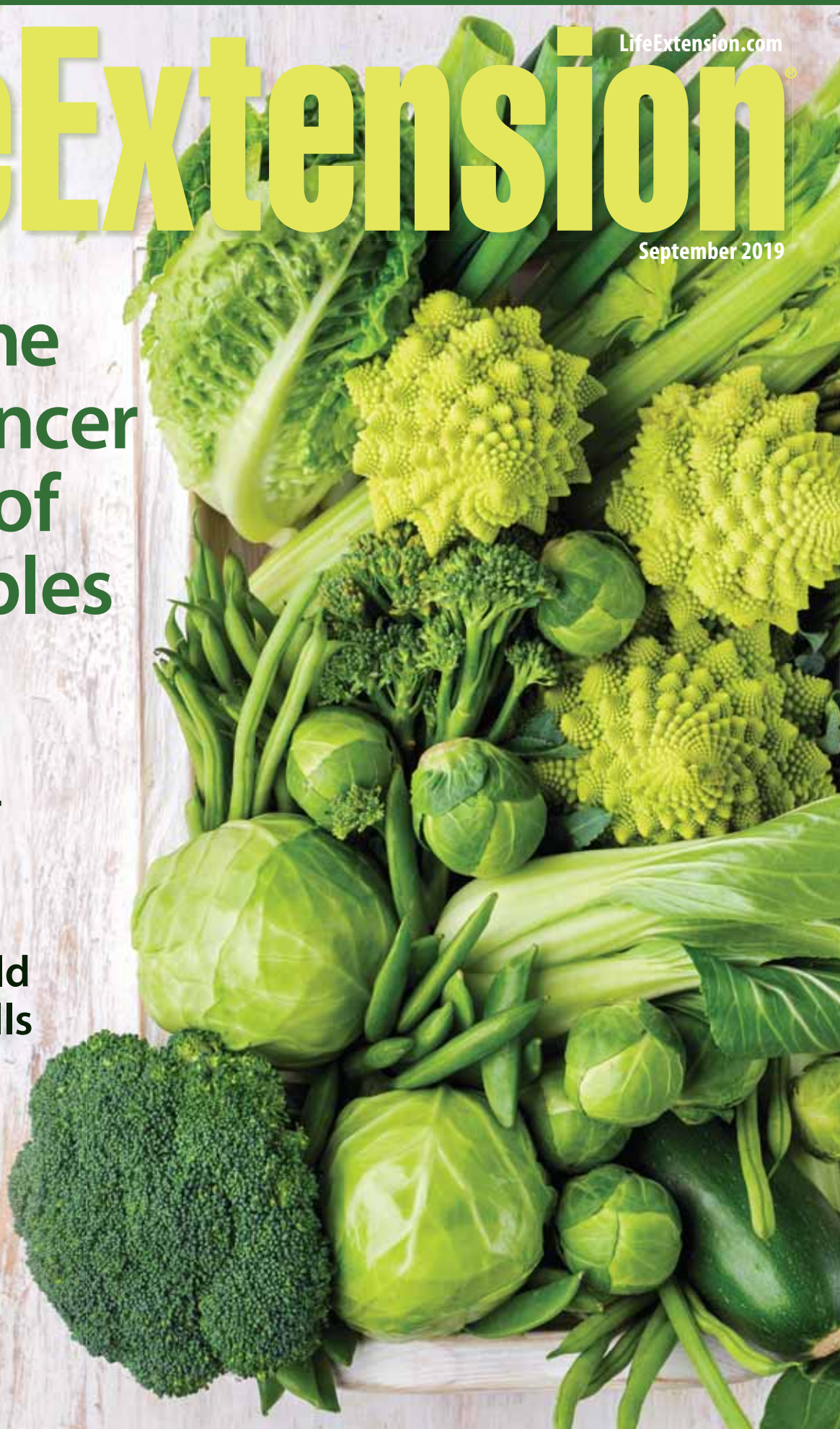

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BY WILLIAM FALOON

Cancer Death Rates Decline, But Are We Losing the War?

The **American Cancer Society** made a big announcement earlier this year:

Cancer death rates for men and women plummeted **27%** between **1991** and **2016.**[1]

This is exciting news but overlooks the fact that more Americans are dying of **cancer** than ever before.[2] A record **607,000** cancer deaths will occur in the United States this year.[1]

Not factored into these numbers are **side effects** inflicted by surgery, radiation, chemotherapy, and newer immune-modulating drugs like Keytruda®.

These side effects go beyond the miseries suffered during conventional treatment. Many patients exposed to these therapies are at increased risk of **heart failure** and secondary malignancies.

For example, **breast cancer** patients treated with radiation and certain chemo drugs have up to a **4.2-fold** increased risk of **leukemia** that is often difficult to cure.[3]

So, while cancer death **rates** declined **27%** since 1991, more Americans than ever before are being diagnosed with **cancer** and aggressively **treated**.

We at **Life Extension®** advocate for proactive **prevention**. A lot starts with healthy diet, including consumption of **cruciferous vegetables** that are rich in **cancer-fighting** compounds.[4]

In a major advance, a new **cruciferous vegetable formula** enables people to achieve ***higher*** blood levels of **anti-cancer** nutrients than ever before.

Transformative potential now exists to reduce the number of newly diagnosed **malignancies**, as opposed to more effectively **treating** those who fall victim.

Cruciferous vegetables have long been known to reduce one's risk of developing cancer.[5-8]

A partial list of cruciferous vegetables includes **kale**, **cabbage**, **Brussels sprouts**, **cauliflower**, **watercress,** and **broccoli**.

These plants contain **anti-cancer** components, as demonstrated by hundreds of published studies.[9,10]

The challenge has been to identify growing conditions, cooking methods, and even how to eat these plants in order to obtain optimal amounts of active **anti-cancer** compounds.[11]

Why Vegetable "Sprouts and Seeds" Are Beneficial

Vegetables undergo a maturation process whereby their **biochemistry** changes with age.

As vegetables **sprout** from seeds, they naturally express **nutrients** that have been shown to be especially protective against **cancers**.

Broccoli sprouts and **seeds** contain huge amounts of a compound called **glucoraphanin** and a critical *enzyme* called **myrosinase**.

This *enzyme* is needed to transform **glucoraphanin** into an anti-cancer compound called **sulforaphane**.[12]

The sequence is as follows:

BROCCOLI SEEDS or SPROUTS
↓
GLUCORAPHANIN
↓
MYROSINASE
↓
SULFORAPHANE

The **glucoraphanin** content of broccoli dramatically diminishes as the plant grows into the familiar vegetable we see at the market.[12]

Excited by the anti-cancer potential of **glucoraphanin**, researchers began to study broccoli sprouts to better understand potential therapeutic applications.

Formation Pathway of Anti-Cancer Compounds In Cruciferous Vegetables

Broccoli sprouts and **seeds** contain large amounts of **glucoraphanin** that is converted by the **myrosinase** *enzyme* into an anti-cancer compound called **sulforaphane**.[12-14]

Mature broccoli also contains these anti-cancer compounds, but in far smaller amounts.

GLUCORAPHANIN

CONVERTED BY MYROSINASE

Cancer-Fighting SULFORAPHANE

How Sulforaphane Was Discovered

In **1992**,[15] scientists at **Johns Hopkins** showed that three-day-old **broccoli sprouts** contain **10** to **100 times** higher the amount of **anti-cancer** compounds compared to **mature** broccoli.[12]

These scientists were the first to isolate and patent high-potency **sulforaphane** for its **cancer prevention** properties.[16,17]

They showed that female rats administered **sulforaphane** developed fewer, smaller, and slower growing **tumors** compared with controls. This study found that after rats were exposed to a potent carcinogen, a double dose of **sulforaphane** reduced tumor incidence and number by more than **50%** compared with controls.[18]

Researchers later discovered that **broccoli seeds** have an even ***higher*** content of **glucoraphanin** than **broccoli sprouts**.[19]

Most People Eat Broccoli Wrong

More people eat broccoli today than ever before. Yet few derive maximum benefits.

One reason is that the **cooking** of broccoli reduces broccoli's beneficial components. These include **glucoraphanin** and **myrosinase** that convert to biologically-active **sulforaphane**.[20]

Another cruciferous compound is **I3C** (indole-3-carbinol). It also requires the **myrosinase** *enzyme* to fully activate. **I3C** has demonstrated profound anti-cancer effects in rats.[12,21]

I3C itself is not particularly stable, but quickly converts to a beneficial compound called **DIM** (3,3'-diindolylmethane). **DIM** has demonstrated hormone-modulating properties that have cancer-fighting effects.[22,23]

To derive maximum benefits from broccoli sprouts or mature florets, eat them **raw** and chew them well.

A less expensive and more convenient method is to ingest a new **cruciferous formula** that delivers ***higher*** potencies of **sulforaphane** and **DIM** into the human bloodstream.

Take-Home Lesson About Sulforaphane

Published studies show **sulforaphane** is the compound in **broccoli** with the most demonstrated cell-protecting benefits.[24-36]

The amount of **sulforaphane** people obtain when eating **mature broccoli** or even **broccoli sprouts** is trivial when compared to a newly designed cruciferous formula.[37,38]

To understand why people aren't benefiting more from **cruciferous vegetables**, one must understand limitations that prevent significant amounts of **anti-cancer** compounds from being delivered into the bloodstream.

In the broccoli plant there are separate cell **compartments** that contain **glucoraphanin** and the *enzyme* **myrosinase**.[39]

With chewing, these broccoli cell compartments **rupture** and **glucoraphanin** is exposed to the **myrosinase** *enzyme* that converts it to **sulforaphane**.

Cancer Risk Reduction with Cruciferous Vegetables

The following percentages of cancer risk reduction are based on dietary intake of people ingesting the highest versus the lowest amounts of cruciferous vegetables.

They do not reflect the potential benefits of a newly designed formulation that enables *higher* quantities of bioavailable **sulforaphane** to be absorbed into the blood.

CANCER	RISK REDUCTION
Colorectal	49% [49]
Melanoma	46% [50]
Prostate	42% [51]
Pancreas	34% [52]
Kidney	32% [53]
Bladder	31% [54]
Esophagus	28% [55]
Ovary	24% [56]
Lung	22% [57]
Breast	17% [55]
Mouth and Throat	17% [55]

Sulforaphane is ***absorbed*** into the bloodstream mostly in the small **intestine**.[40,41]

When one eats broccoli, the **myrosinase** *enzyme* quickly converts **glucoraphanin** to **sulforaphane.** Beneficial **sulforaphane**, however**,** is an unstable compound that is highly susceptible to degradation.[42]

Why Sulforaphane Is Not Better Absorbed

The conversion of **glucoraphanin** into sulforaphane **varies** greatly with plant maturity and freshness. A lot depends on the amount of myrosinase and glucoraphanin in a cruciferous vegetable on a given day.[13,43,44]

Conversion to sulforaphane is never **100%** because raw broccoli plants contain additional ingredients that support formation of **inactive compounds** rather than the beneficial **sulforaphane**.[42]

Thus, only a small amount of **sulforaphane** from ingested broccoli makes it to the **small intestine** for optimal ***absorption*** into the blood.

When looking at the substantial reductions in **cancer risk** in people who eat the highest amount of **cruciferous vegetables**, there is enormous potential to prevent more cancers by delivering ***higher*** levels of **sulforaphane**.

A new technology does just that by keeping **myrosinase** and **glucoraphanin** separate until they reach the **small intestine**, where they combine to provide far higher amounts of **sulforaphane**.

Findings from Human Study

In a study done at **Johns Hopkins**, healthy people were given **glucoraphanin** alone or combined in a special preparation with the **myrosinase** enzyme.[13]

Average age of study participants was 54 years and **urinary metabolites** of **sulforaphane** were used to assess **bioavailability**.

Bioavailability of **glucoraphanin** alone was about **10%**, which is good. This means that about **10%** of ingested **glucoraphanin** was converted into **sulforaphane**. However, when conversion to **sulforaphane** relies solely on gut enzymes there is **large variability** among subjects.[13]

When preparations that contained **glucoraphanin** were combined with **myrosinase**, the findings showed **bioavailability** increased from **10%** to about **35%**. This translates into a greater than **3-fold** increase in cancer-fighting **sulforaphane**.[13]

Reverse Gene Mutations

Recent studies reveal **cruciferous compounds** regulate **genes** that are responsible for the uncontrolled proliferation and survival of various types of cancer cells. [36,40,45]

The ***New England Journal of Medicine*** defined cancer as follows:

"Cancer results from the accumulation of mutations in genes that regulate cellular proliferation."[46]

We now know that **cruciferous compounds** favorably regulate **genes** that control cell proliferation.

Gene regulation is one of several **anti-cancer** mechanisms possessed by these vegetable extracts.[47]

Sulforaphane and **DIM** have been found to reverse **gene mutations** that are involved in cancer **initiation** and **progression**.[48]

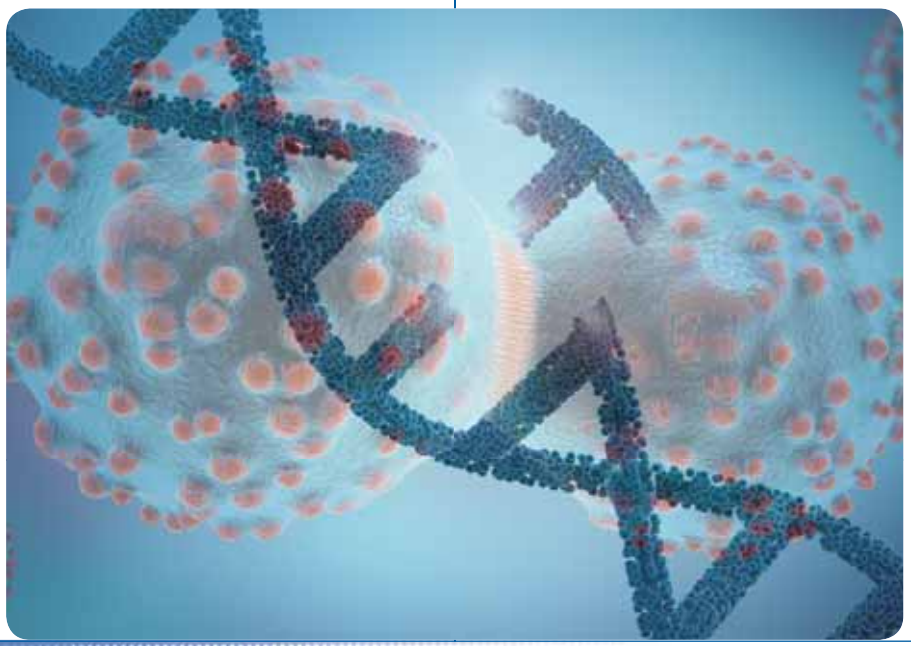
Shield Against Environmental Carcinogens

Herbicides, pesticides, drinking water, plastics, and industrial emissions contain cancer-causing toxins.[58]

These chemicals lead to cancer by damaging our **DNA** and impeding our **detoxification** pathways. [59-62]

It is virtually impossible to avoid the onslaught of **environmental toxins**.

It is possible, however, to equip your body with the tools it needs to target toxins and remove them before they cause serious damage.



Cruciferous vegetables do just that. They optimize crucial aspects of the body's **detoxification system** to neutralize many chemical threats—and maintain the integrity of cellular DNA in the process.[40,63,64]

Decades of research show that consuming ***cruciferous vegetables*** can slash **risk of cancer.** These findings reveal reduced risk of virtually every major type of cancer.[36,40,65]

Overcome Limitations On Cancer Risk Reduction

There is no doubt that **cruciferous vegetables** contain cancer-preventing compounds.

Yet the most favorable data show only up to a **49%** reduction in cancer incidence in those who eat the most broccoli, cauliflower, etc.[49,50,53-57]

My concern is that even people who eat plenty of vegetables still have significant cancer risks. And most people are challenged to eat lots of cruciferous vegetables on a consistent basis.

This makes the advent of the first technology that separates **myrosinase** from **glucoraphanin** so exciting. It greatly increases the amount of bioactive **sulforaphane** that can be readily **absorbed** in the small intestine.

Up until recently, **myrosinase** was not available in stable form. Few companies provide this *enzyme* together with **glucoraphanin**.

And no one is separating **myrosinase** from **glucoraphanin** to ensure optimal conversion to **sulforaphane** in the small intestine for maximum ***absorption***.

Another limitation is that cruciferous vegetables are often cooked or frozen, which reduces the amount of **glucoraphanin** and destroys the **myrosinase** needed to transform **glucoraphanin** into **sulforaphane**.[37,38]

Why Not Take Sulforaphane?

You may ask: why not just ingest **sulforaphane** itself?

The reason this is not practical is that **sulforaphane** is highly reactive and unstable. A person would have to specially prepare and ingest fresh sulforaphane within minutes.[13,66]

Sulforaphane's instability also means a limited "shelf-life" and it would be unfeasible for a supplement formula.

Thus, ideally, we don't want **sulforaphane** produced until it reaches the small intestine where it gets optimally ***absorbed*** quickly.

A new formulation that **compartmentalizes** and then properly releases **myrosinase** plus **glucoraphanin** is the ideal method of delivering **sulforaphane** throughout your body.

Transformative Potential

When one studies the beneficial effects of **sulforaphane**, there is now transformative potential to reduce the number of newly diagnosed malignancies.

For newly diagnosed cancer patients, an article in this month's issue describes the benefit of storing one's bone marrow **stem cells** *prior* to conventional treatments.

Another article highlights how cruciferous vegetables protect against chronic inflammation, and even aging.

We also present recent findings on two drugs that show improved survival in **breast** and **prostate** cancer patients, and describe how excess **bone loss** can fuel cancer cell propagation.

Despite these favorable discoveries, more than **600,000** Americans are losing their lives each year in this ongoing cancer "war."

We at **Life Extension®** advocate for more **cancer research** and intelligent translation of favorable findings into clinical practice, so that more human lives can be spared.

For longer life,

William Faloon, Co-Founder
Life Extension® Buyers Club

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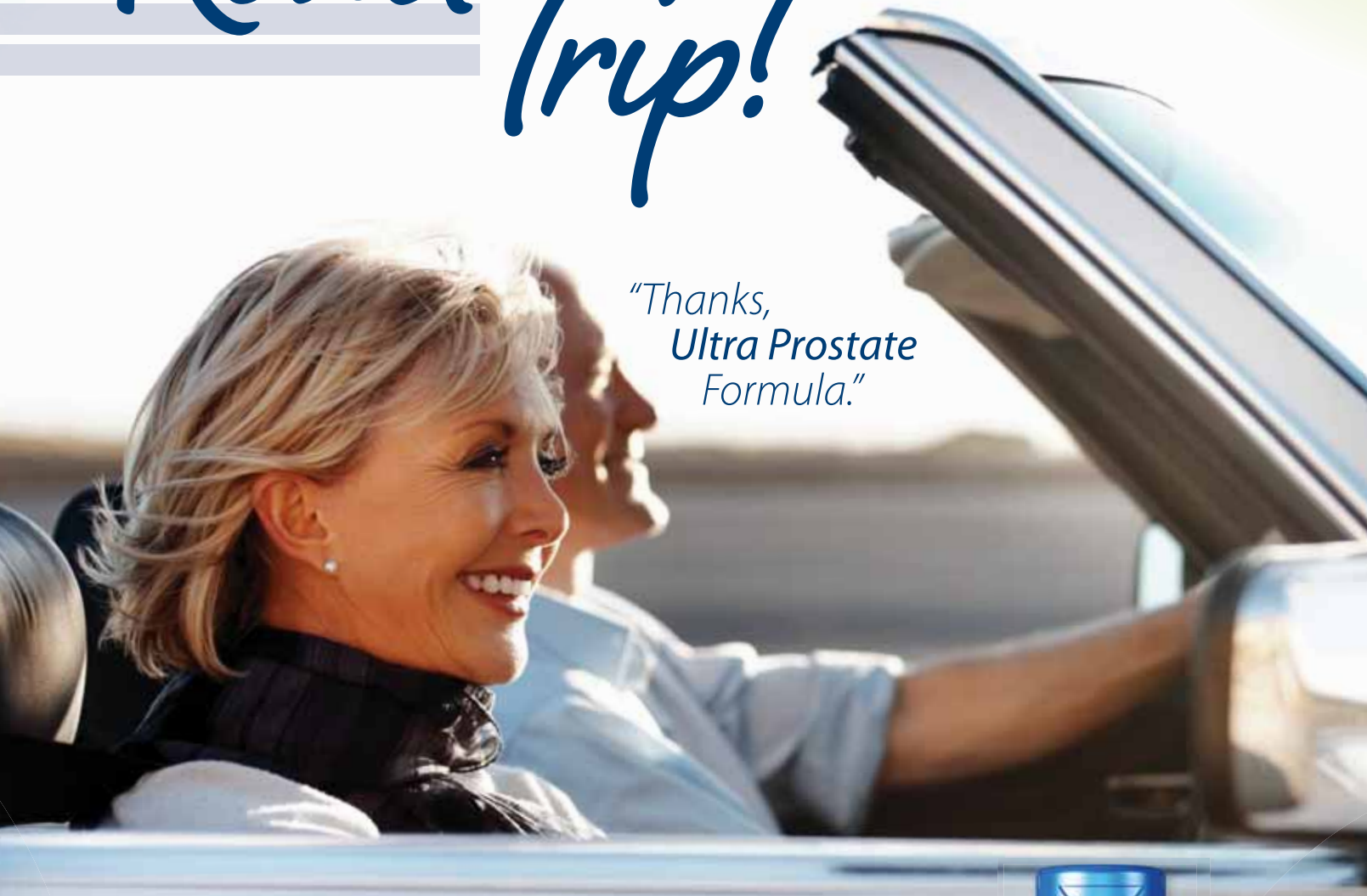

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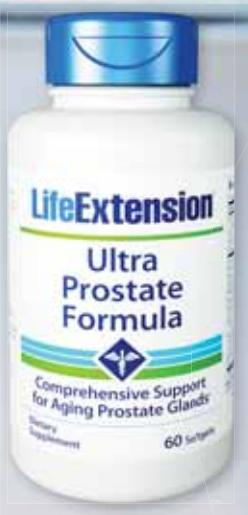

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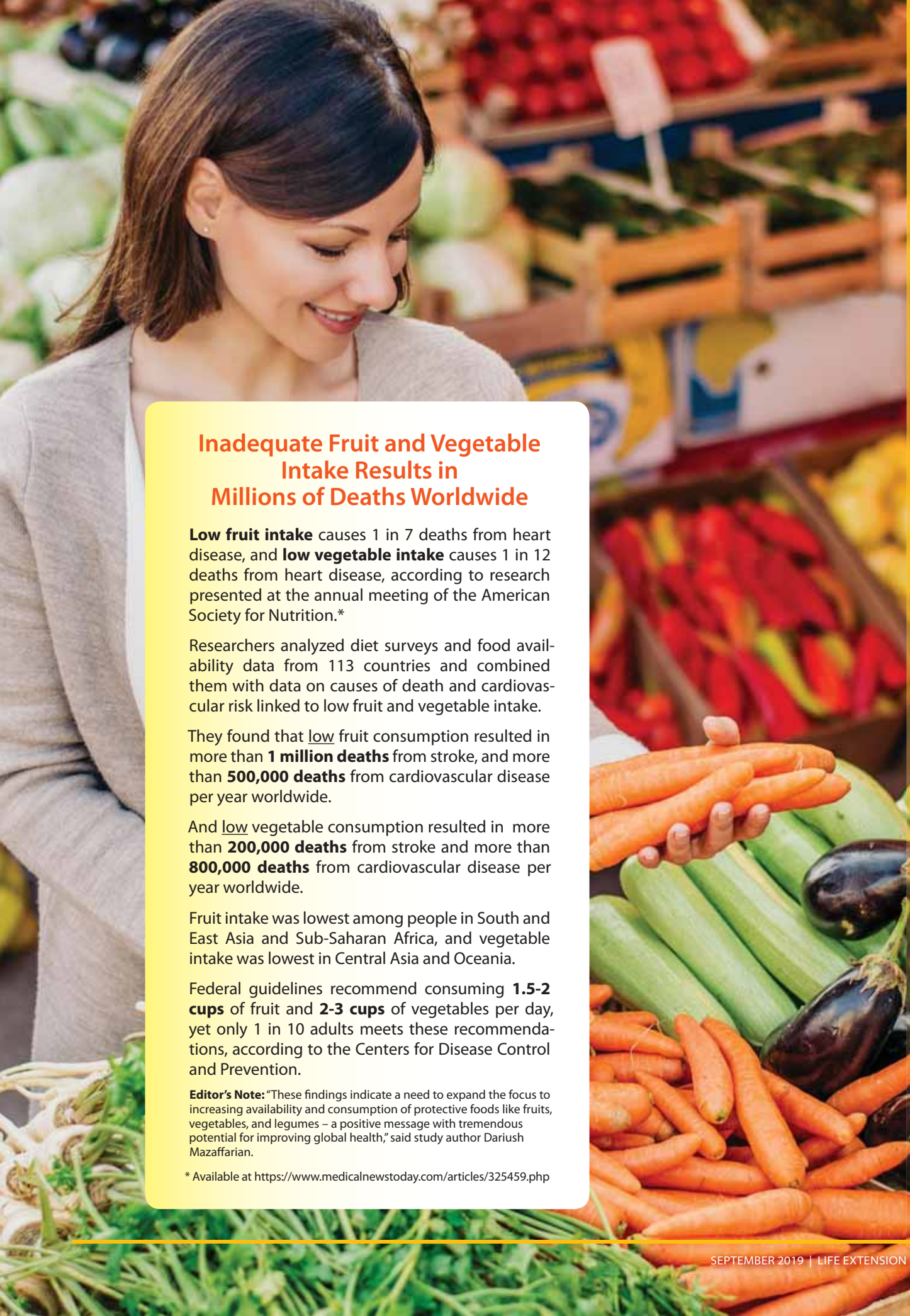


Inadequate Fruit and Vegetable Intake Results in Millions of Deaths Worldwide

Low fruit intake causes 1 in 7 deaths from heart disease, and **low vegetable intake** causes 1 in 12 deaths from heart disease, according to research presented at the annual meeting of the American Society for Nutrition.*

Researchers analyzed diet surveys and food availability data from 113 countries and combined them with data on causes of death and cardiovascular risk linked to low fruit and vegetable intake.

They found that low fruit consumption resulted in more than **1 million deaths** from stroke, and more than **500,000 deaths** from cardiovascular disease per year worldwide.

And low vegetable consumption resulted in more than **200,000 deaths** from stroke and more than **800,000 deaths** from cardiovascular disease per year worldwide.

Fruit intake was lowest among people in South and East Asia and Sub-Saharan Africa, and vegetable intake was lowest in Central Asia and Oceania.

Federal guidelines recommend consuming **1.5-2 cups** of fruit and **2-3 cups** of vegetables per day, yet only 1 in 10 adults meets these recommendations, according to the Centers for Disease Control and Prevention.

Editor's Note: "These findings indicate a need to expand the focus to increasing availability and consumption of protective foods like fruits, vegetables, and legumes – a positive message with tremendous potential for improving global health," said study author Dariush Mazaffarian.

* Available at https://www.medicalnewstoday.com/articles/325459.php

Salk Institute Team Develops Fisetin, Curcumin, Compounds that Slow Aging

An article published in *Trends in Pharmacological Sciences* reported that researchers from the Salk Institute in La Jolla, CA have synthesized potential treatments for Alzheimer's and other neurodegenerative diseases from two compounds that have already been identified as geroprotectors.*

Dr. David Schubert and his colleagues explained that, "Geroprotectors are compounds that slow the rate of biological aging and therefore may reduce the incidence of age-associated diseases such as Alzheimer's disease."

Starting with the geroprotectors curcumin (which is derived from turmeric) and fisetin (found in strawberries and other fruits and vegetables), the researchers synthesized three compounds labeled CMS121, CAD31, and J147. These compounds and their parent compounds, dubbed "geroneuroprotectors," decreased molecular markers of aging and dementia in mice and flies and extended their median lifespan.

"If these drugs have benefits for other body systems, such as maintaining kidney function and overall muscle health, they could be used in additional ways to treat or prevent the diseases of aging," Dr. Schubert said.

Editor's Note: Senior author Dr. Pamela Maher noted that, "Since we found that the natural products curcumin and fisetin are also GNPs [geroneuroprotectors] and commercially available as supplements, they could provide some therapeutic benefits right now."

* *Trends Pharmacol Sci.* 2018 Dec;39(12):1004-1007.

Vitamin-D Deficient Older Adults May have Greater Odds of Developing Depression

Researchers at Trinity College in Dublin, Ireland reported a **75%** increase in the likelihood of developing depression among older individuals with deficient levels of vitamin D.*

The investigation included 3,965 participants aged 50 and older who participated in the Irish Longitudinal Study on Aging. Blood levels of vitamin D were measured on enrollment and the presence of depression was evaluated at two and four years.

Being deficient in vitamin D was associated with a **75%** increase in the likelihood of developing depression over the follow-up period than for people who had nondeficient levels.

"This is the largest representative and most comprehensive study of depression risk and vitamin D status in older adults ever conducted in Ireland," stated first author Dr. Robert Briggs. "Our findings will provide useful information to help inform public health policy—particularly regarding the proposition of the usefulness of vitamin D treatment/supplementation for depression."

Editor's Note: Senior author Dr. Eamon Laird said that, "This study shows that vitamin D is associated with a health condition other than bone health. What is surprising is the large effect on depression even after accounting for other control variables."

* *J Am Med Dir Assoc.* 2019 May;20(5):517-523.

Drinking Coffee May Reduce Risk of Developing Type II Diabetes

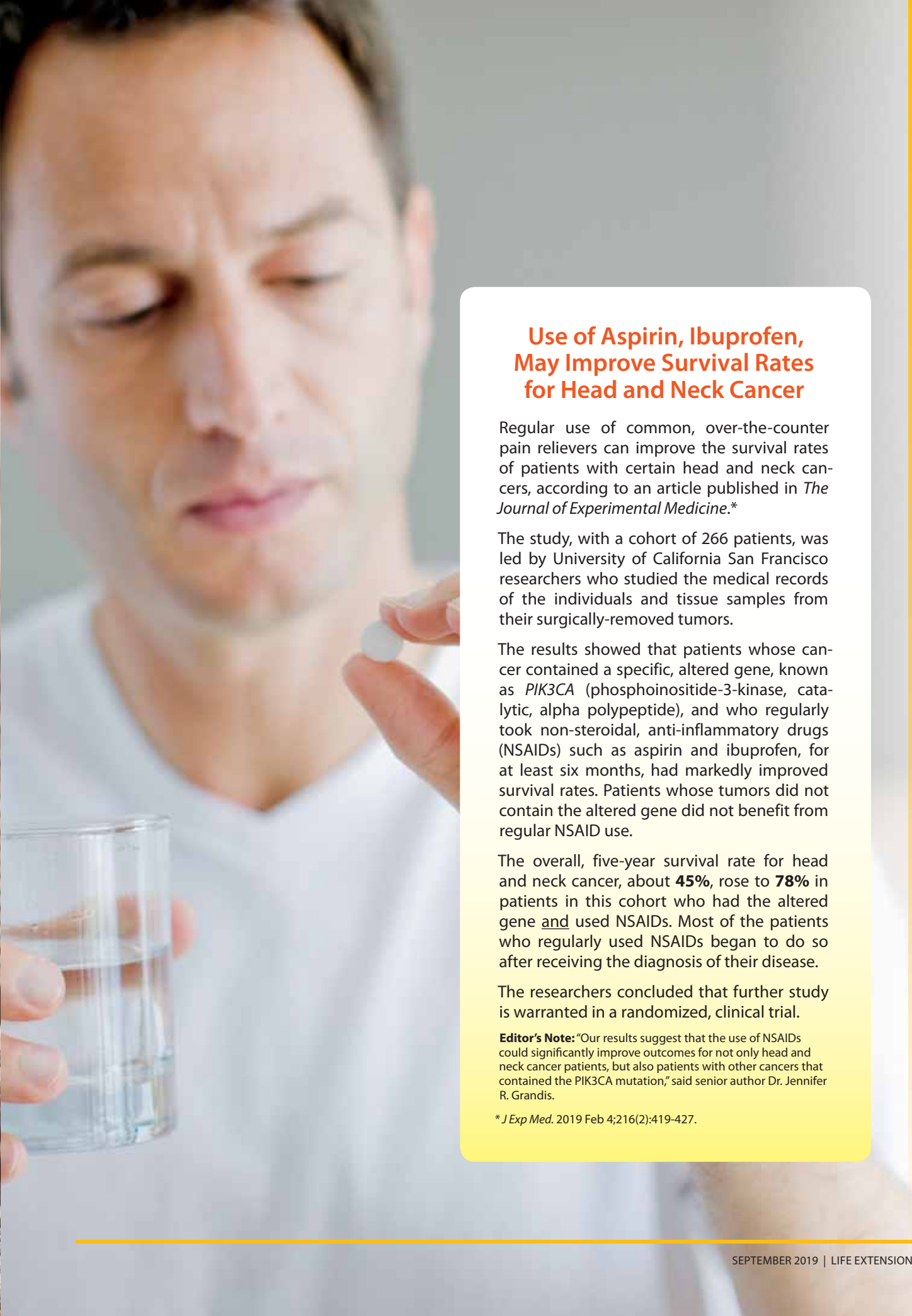
The results of a meta-analysis of more than one million subjects, reported in *Nutrition Reviews*, indicated that the risk of developing type II diabetes was lower in coffee drinkers in comparison with individuals who didn't drink coffee.*

Researchers analyzed data from 30 prospective studies published through 2017 that included a total of 1,185,210 people, 53,018 of whom had developed type II diabetes.

A pooled analysis of the subjects revealed a **29%** lower risk of developing diabetes in those who were in the highest category of coffee consumption (at a median intake of **five cups per day**) compared to the group who drank no coffee. For every cup per day increase in caffeinated coffee consumption, the risk of developing type II diabetes was lowered by **7%**. Drinking decaffeinated coffee lowered the risk of type II diabetes by **6%** per additional cup.

Editor's Note: The researchers concluded that, "Available evidence indicates that coffee consumption is inversely associated with risk of T2D [type II diabetes]. Possible mechanisms behind this association include thermogenic, antioxidative, and anti-inflammatory effects; modulation of adenosine receptor signaling; and microbiome content and diversity."

* *Nutr Rev.* 2018 Jun 1;76(6):395-417.



Use of Aspirin, Ibuprofen, May Improve Survival Rates for Head and Neck Cancer

Regular use of common, over-the-counter pain relievers can improve the survival rates of patients with certain head and neck cancers, according to an article published in *The Journal of Experimental Medicine*.*

The study, with a cohort of 266 patients, was led by University of California San Francisco researchers who studied the medical records of the individuals and tissue samples from their surgically-removed tumors.

The results showed that patients whose cancer contained a specific, altered gene, known as *PIK3CA* (phosphoinositide-3-kinase, catalytic, alpha polypeptide), and who regularly took non-steroidal, anti-inflammatory drugs (NSAIDs) such as aspirin and ibuprofen, for at least six months, had markedly improved survival rates. Patients whose tumors did not contain the altered gene did not benefit from regular NSAID use.

The overall, five-year survival rate for head and neck cancer, about **45%**, rose to **78%** in patients in this cohort who had the altered gene and used NSAIDs. Most of the patients who regularly used NSAIDs began to do so after receiving the diagnosis of their disease.

The researchers concluded that further study is warranted in a randomized, clinical trial.

Editor's Note: "Our results suggest that the use of NSAIDs could significantly improve outcomes for not only head and neck cancer patients, but also patients with other cancers that contained the PIK3CA mutation," said senior author Dr. Jennifer R. Grandis.

* *J Exp Med.* 2019 Feb 4;216(2):419-427.

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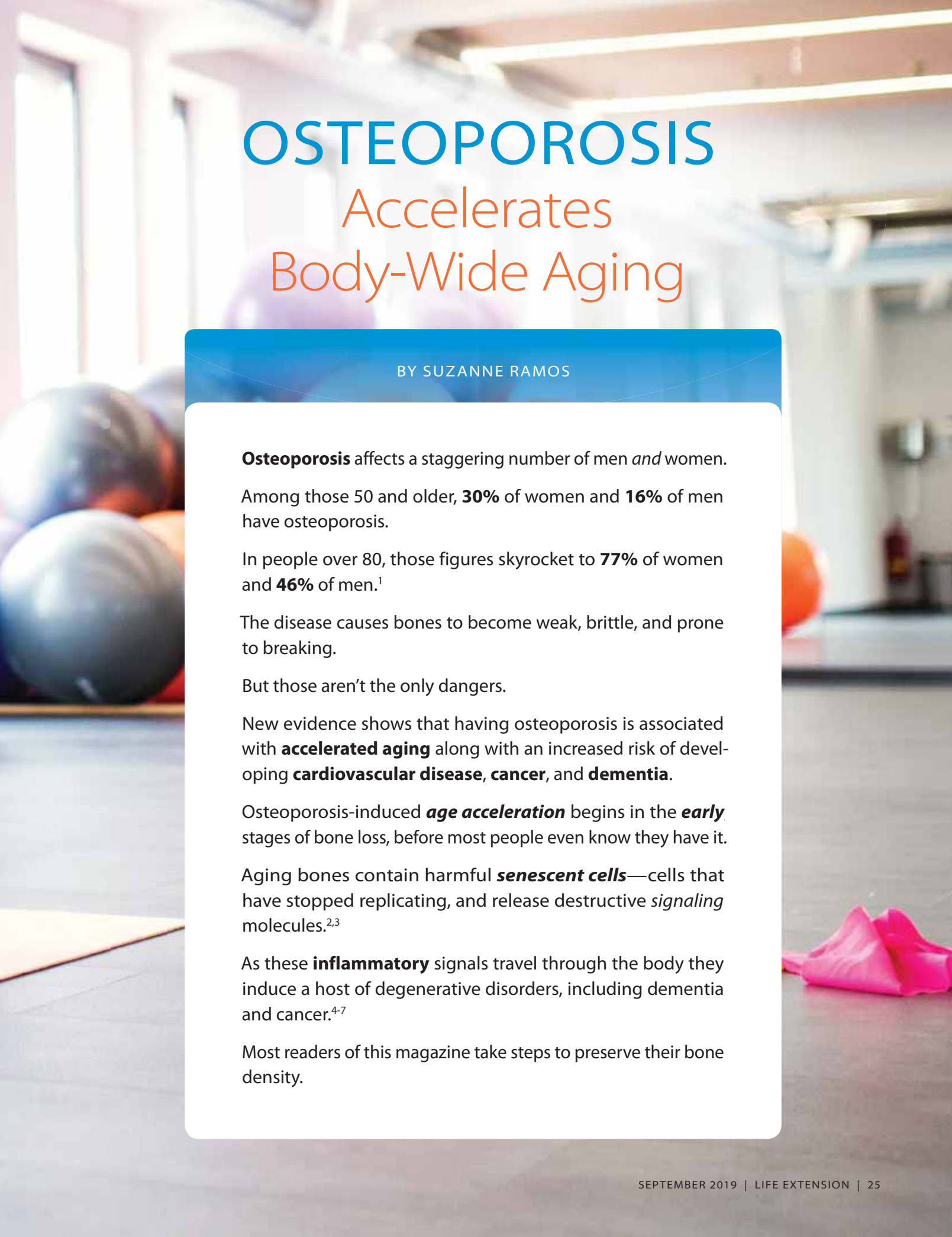


OSTEOPOROSIS Accelerates Body-Wide Aging

BY SUZANNE RAMOS

Osteoporosis affects a staggering number of men *and* women.

Among those 50 and older, **30%** of women and **16%** of men have osteoporosis.

In people over 80, those figures skyrocket to **77%** of women and **46%** of men.[1]

The disease causes bones to become weak, brittle, and prone to breaking.

But those aren't the only dangers.

New evidence shows that having osteoporosis is associated with **accelerated aging** along with an increased risk of developing **cardiovascular disease**, **cancer**, and **dementia**.

Osteoporosis-induced ***age acceleration*** begins in the ***early*** stages of bone loss, before most people even know they have it.

Aging bones contain harmful ***senescent cells***—cells that have stopped replicating, and release destructive *signaling* molecules.[2,3]

As these **inflammatory** signals travel through the body they induce a host of degenerative disorders, including dementia and cancer.[4-7]

Most readers of this magazine take steps to preserve their bone density.

How Bone Loss Speeds Aging

Healthy bone is constantly being remodeled. Old bone is broken down and new bone is made.

Cells that *build* bone are called **osteoblasts**. Cells that *break down* bone are called **osteoclasts**.

In young, growing bodies, osteoblast activity surpasses osteoclast activity. In healthy adulthood, the activities are roughly balanced.

But as we age, *osteoclast* activity begins to exceed *osteoblast* activity. That leads to bone mineral loss, contributing to higher risk of fractures.

In people suffering from **osteoporosis**, the activity of osteoclasts is especially high.

Researchers have learned that **osteoclasts** send out **signals** that can promote system-wide **inflammation**.[8-11] Chronic inflammation increases risks for cardiovascular disease, cancer, and dementia, and the acceleration of aging.[12]

Aging bones are a site where **senescent cells** accumulate with aging.[13]

These senescent cells damage bones by increasing bone *resorption* (breakdown) while decreasing *new bone formation* (the definition of osteoporosis).

Senescent cells and the harmful products they release contribute not only to osteoporosis, but also Alzheimer's, type II diabetes, cancer, and cardiovascular disease.[4,13-15]

Osteoporosis and Heart Disease

Osteoporosis increases the risk of **cardiovascular disease** in ways that go beyond inflammation.

In one study, scientists examined heavily **calcified arteries**, a major contributor to arterial stiffening and cardiovascular disease, and determined that actual bone was present **6%** of the time.[16]

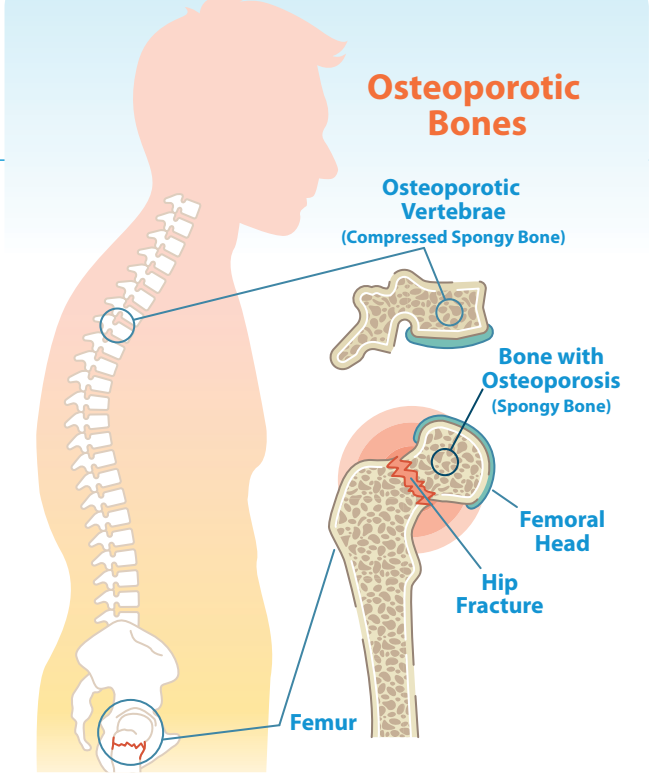
Osteoclast-like cells are often found in plaque deposits in the arteries.[17,18] In osteoporosis patients, a marker of inflammation has been shown to be elevated, along with an increased risk for cardiovascular disease.[19]

Vitamin K2 helps prevent this type of **arterial calcification**.[20]

Osteoporosis and Dementia

People with Alzheimer's disease frequently have low bone mineral density and a higher rate of hip fractures compared to non-Alzheimer's patients.[21]

Alzheimer's disease prevalence is also higher in postmenopausal women with severe osteoporosis, especially those with femoral fractures, than in those without osteoporosis.[22] These findings suggest close connections between the two apparently different conditions.



Recent studies have identified disruption of important *signaling* molecules (in addition to inflammatory cytokines) that seem to drive this association.

In particular is a system called RANKL, which is involved in switching on and off certain **genes** involved in both osteoporosis and many dementias.[23]

A related system involving **colony stimulating factor-1** regulates both bone resorption by osteoclasts, and also immune cells in the brain that regulate brain cell survival.[24]

And, the finding of large numbers of **senescent cells** in osteoporotic bones is likely to further accelerate body-wide aging, including in the brain.[4,14]

Osteoporosis and Cancer Risk

People with **osteoporosis** have an *increased* risk of **cancer** compared to those whose bones remain healthy with aging.[25-27] While having cancer can weaken bones through malnutrition and metastases, the opposite finding is a surprise.

A recent study suggests links between osteoporosis and the risk of cancer. Bone proteins associated with osteoporosis have been identified in the molecular pathways leading to cancer. These growth proteins are normally involved in bone maintenance and healing, but when *over-activated* they can lead to out-of-control cell growth and replication as seen in cancers.

Similarly, the master inflammation regulator NF-kB stimulates both bone resorption and cancer initiation and promotion.

Finally, many disorders that lead to bone weakness in osteoporosis, such as vitamin D *deficiency* and elevated parathyroid hormone, are also involved in cancer development.[25]

Eight Bone-Building Nutrients

Researchers have identified **eight nutrients** that *safely* help protect our bones — and can prevent osteoporosis-induced age acceleration.

CALCIUM

Calcium is the mineral most of us associate with building strong, healthy bones. Yet many Americans get too little calcium from their diets, with adults 50 and over at particular risk.[28]

Many different types of calcium supplements are available. But some, like calcium carbonate, don't release a lot of calcium into the body to meet daily requirements.[29] ***Calcium bisglycinate*** is better absorbed than calcium carbonate,[30] as is **calcium fructoborate**.

Calcium bisglycinate is completely released into the gut in less than **150 minutes**, while calcium carbonate takes **four hours** and still may not be entirely absorbed.[29]

Calcium fructoborate is also easily absorbed and provides extra **anti-inflammatory** benefits that combat the age acceleration brought on by osteoporosis.

MAGNESIUM

Magnesium supplementation increases bone mineral density.[31]

But about **half** of all Americans fail to consume enough of this vital mineral, and more than **40%** of post-menopausal women have low magnesium levels in their blood. That puts them at high risk for bone breakdown and the problems that result.[32-34]

One study showed that magnesium supplementation for 30 days *raises* blood markers of new bone formation and *reduces* markers of bone breakdown.[34]

MANGANESE

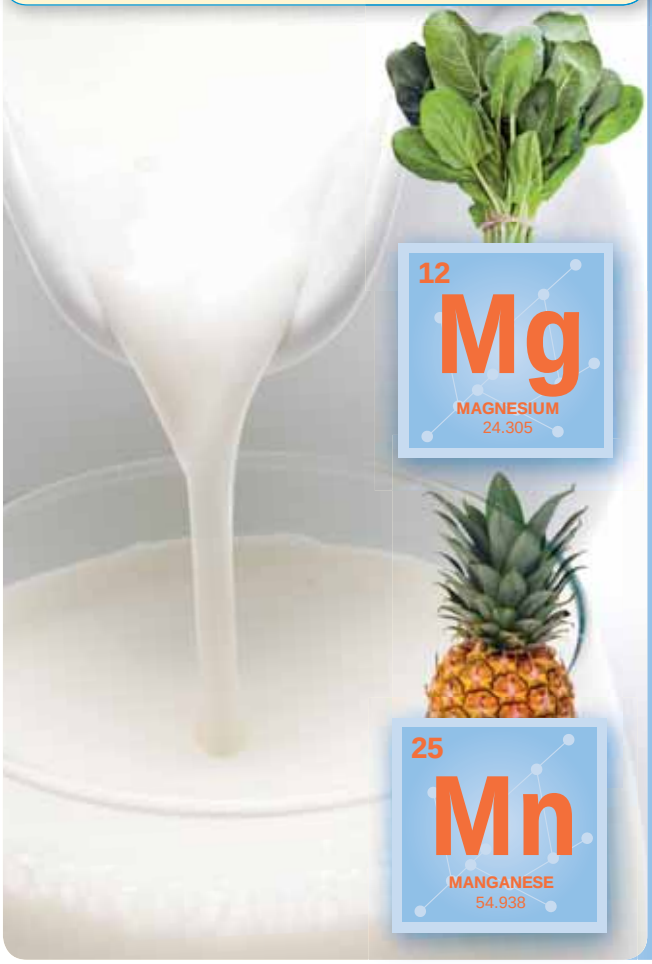
Manganese plays a role in bone health and likely protects against osteoporosis. It may also protect against osteoarthritis.[35]

Manganese is a required cofactor, or helper molecule, for enzymes called ***superoxide dismutases*** that protect mitochondria from accumulated free-radical damage.[36]

Supplementation with manganese *raises* superoxide dismutase levels in animal models, resulting in improvements in tissue structure and function.[37] Manganese supplementation has been shown to help prevent diet-induced diabetes in mice.[38]

Key Nutrients Protect Bone Health

- **Osteoporosis weakens the bones of millions of aging women and men in America, markedly increasing their risk of fractures.**
- **Studies now show that the process of bone breakdown releases potent pro-inflammatory molecules throughout the body.**
- **Increased inflammation raises the risk for disease and contributes directly to an acceleration of the aging process.**
- **Supplementation with eight different nutrients known to protect the bones, including calcium, magnesium, vitamin D, and vitamin K, can help combat osteoporosis, fight inflammation, and slow aging.**



What You Need to Know

VITAMIN D

Vitamin D deficiency is a major contributor to osteoporosis. More than **60%** of U.S. adults have either deficient (less than **20 ng/mL**) or insufficient (**20-30 ng/mL**) vitamin D levels, and these numbers are even higher in older people.[39,40]

Vitamin D also influences functioning of many different organs, so deficiency can induce:[41]

- **Muscle weakening,**
- **Cardiovascular disease,**
- **Type II diabetes, and**
- **Lower cognitive functioning.**

That is why experts now say that year-round vitamin D supplementation is crucial in the elderly.[41]

Vitamin D supplementation has produced improvement in arterial stiffness and endothelial function in people at high risk for diabetes, helping reduce the risk of heart attack or stroke.[42,43]

A recent animal study found that vitamin D supplementation lowered **blood pressure**, improved **heart function**, and prevented **liver damage** in rats fed a typical Western diet, laden with fat and sugar.[44]

Much of this benefit comes from a reduction in **pro-inflammatory** signaling molecules, including those released from **osteoclasts** during bone breakdown.[45,46]

VITAMIN K

Vitamin K plays a major role in balancing bone formation and destruction.[47]

Vitamin K supports *increased* calcium deposition in bones, while *reducing* its accumulation in blood vessel walls. This means it reduces **osteoporosis** *and* **atherosclerosis** risk.[47]

Studies show that **vitamin K2** supplementation helps prevent bone deterioration, decreasing the release of inflammatory **cytokines** that increase aging in all tissues.[48,49]

In those with chronic kidney disease, supplementation with K2 plus vitamin D slows arterial thickening and progress of atherosclerosis.[50]

ZINC

Zinc is a mineral critical for supporting healthy protein synthesis, which, when diminished, contributes to osteoporosis.[51,52]

Zinc deficiency exacerbates the inflammation brought on by bone breakdown, while supplementation in animal models lowers inflammation.[53]

Human studies show that zinc supplementation is essential for normal tissue maintenance in older adults. It decreases markers of bone **resorption** (when bone is broken down and the minerals are released into the blood), limiting release of inflammatory compounds from bone.[51,54]

Recently, zinc has also been shown to promote maturation of bone-forming osteoblasts in animal and preclinical models, supporting bone health and mitigating the age-accelerating effects of bone breakdown.[54,55]

BORON

A deficiency in the mineral **boron** is associated with poor immune function and elevated risk for osteoporosis.[56,57]

Animal studies have shown that boron supplementation can slow bone resorption and enhance new bone formation, fighting osteoporosis.[58-61]

One human study found sharp reductions in bone-released inflammatory cytokines after supplementation with boron, helping mitigate osteoporosis-induced inflammation and damage to other organ systems.[62]

SILICON

Higher intake of the mineral **silicon** correlates with healthier bones.[63,64]

Animal studies show that supplementation with a water-soluble form of silicon may slow the rapid bone turnover in osteoporosis, preventing the bone-breakdown-associated inflammation that causes disease and speeds aging.[65,66]

Lab studies of isolated cells further show that silicon stimulates formation of proteins vital to forming the protein-mineral matrix of bones. It also enhances the maturation of bone-forming osteoblasts.[67]

Summary

Osteoporosis, the gradual loss of bone mineral density, is not only harmful to bones, but to the entire body as well.

Bone-resorbing cells eat their way into mineralized bone, releasing it into the bloodstream, where it can wind up in arteries and other tissues, impeding their function. Those cells also release powerful **inflammatory** compounds that fuel harmful inflammation throughout the body.

This type of chronic inflammation raises risks for **cardiovascular disease**, **cancer**, and **dementia**, and accelerates certain **aging** processes.

Scientists now recognize at least **eight** different, essential nutrients with powerful bone-protecting properties: **calcium, magnesium, manganese, vitamin D, vitamin K, zinc, boron,** and **silicon**.

These nutrients also help temper inflammation and lessen the impact of bone degeneration on the body.

Anyone interested in supporting skeletal health *and* preventing osteoporosis-induced aging should explore supplementation with these low-cost nutrients. ●

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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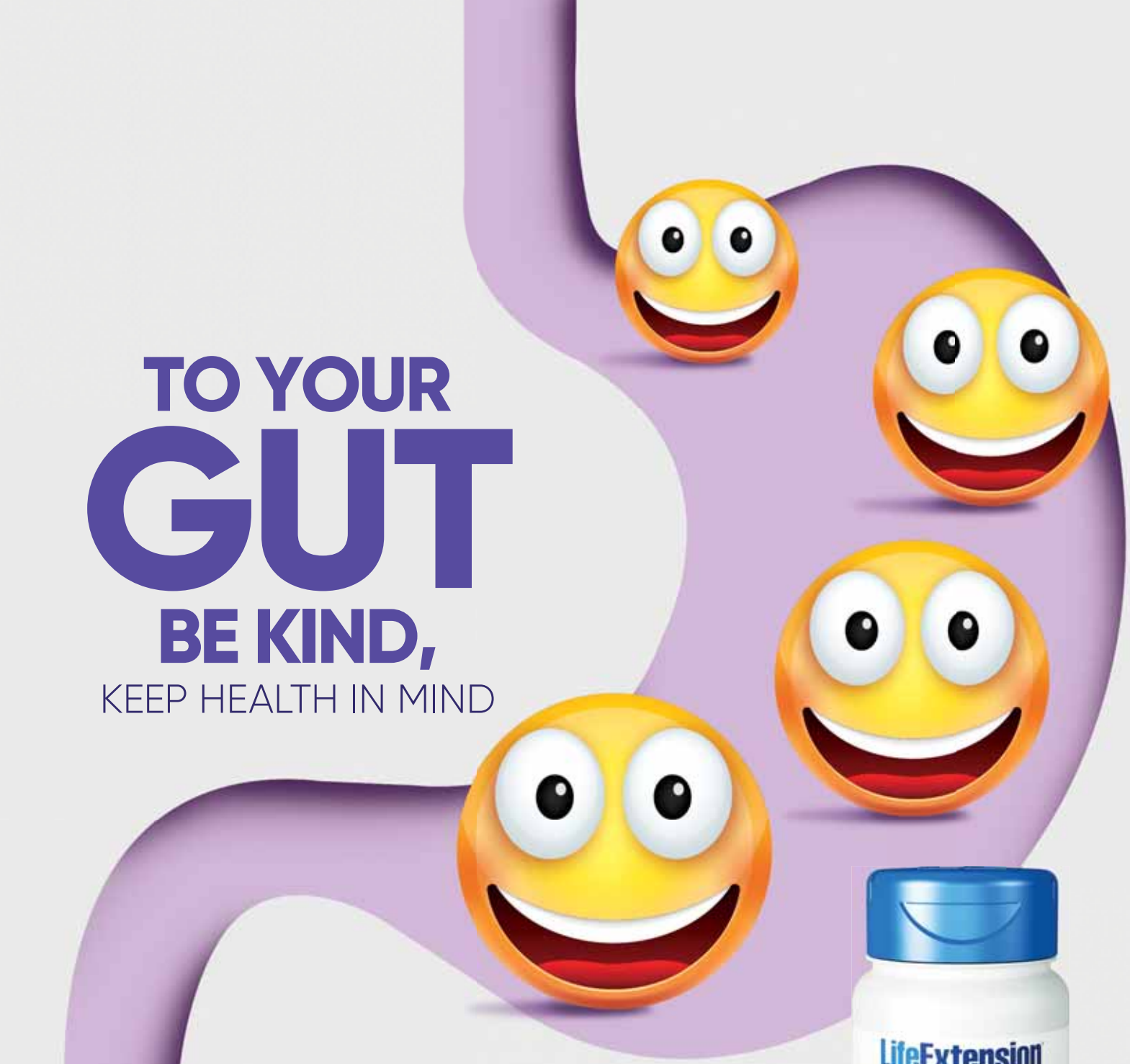

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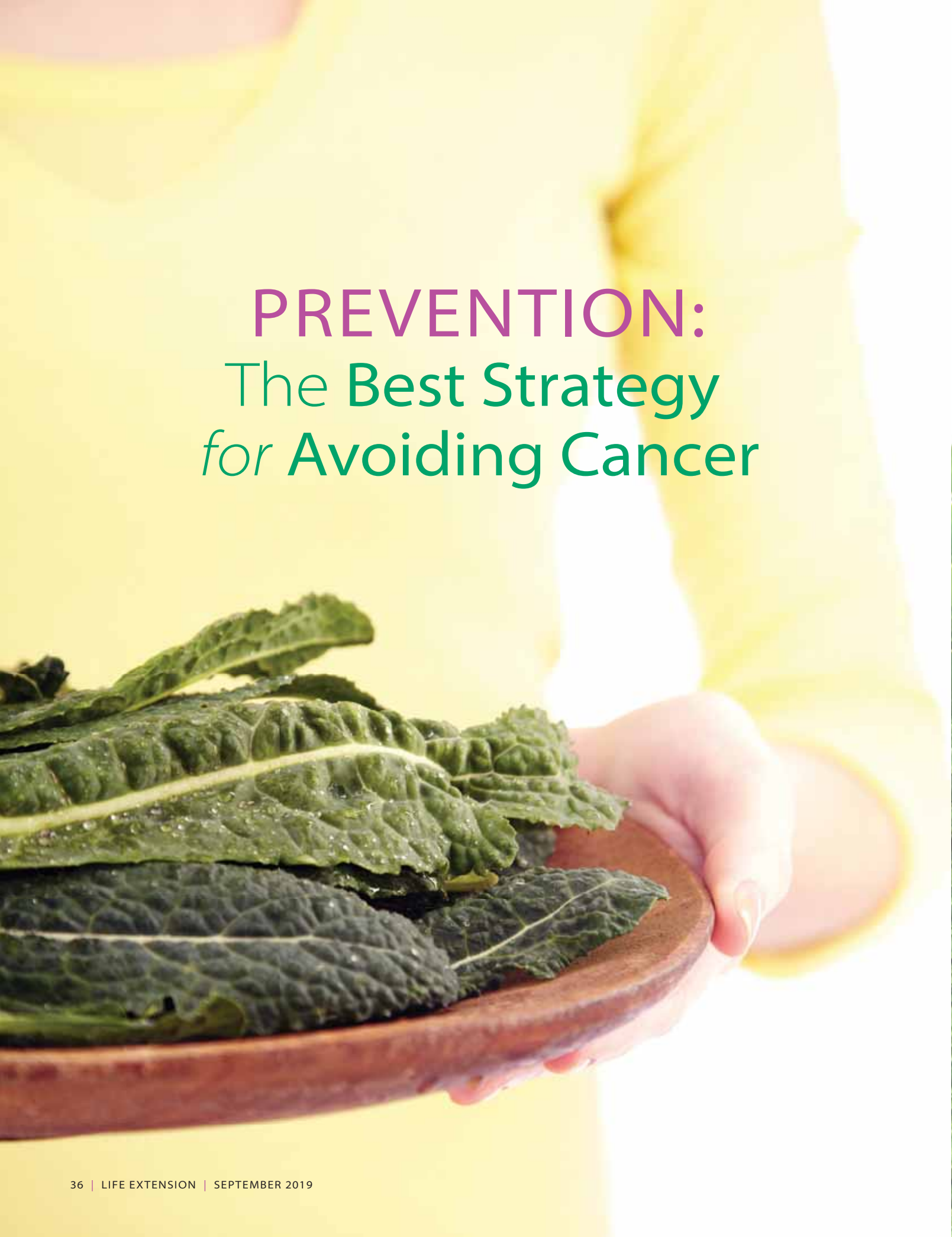
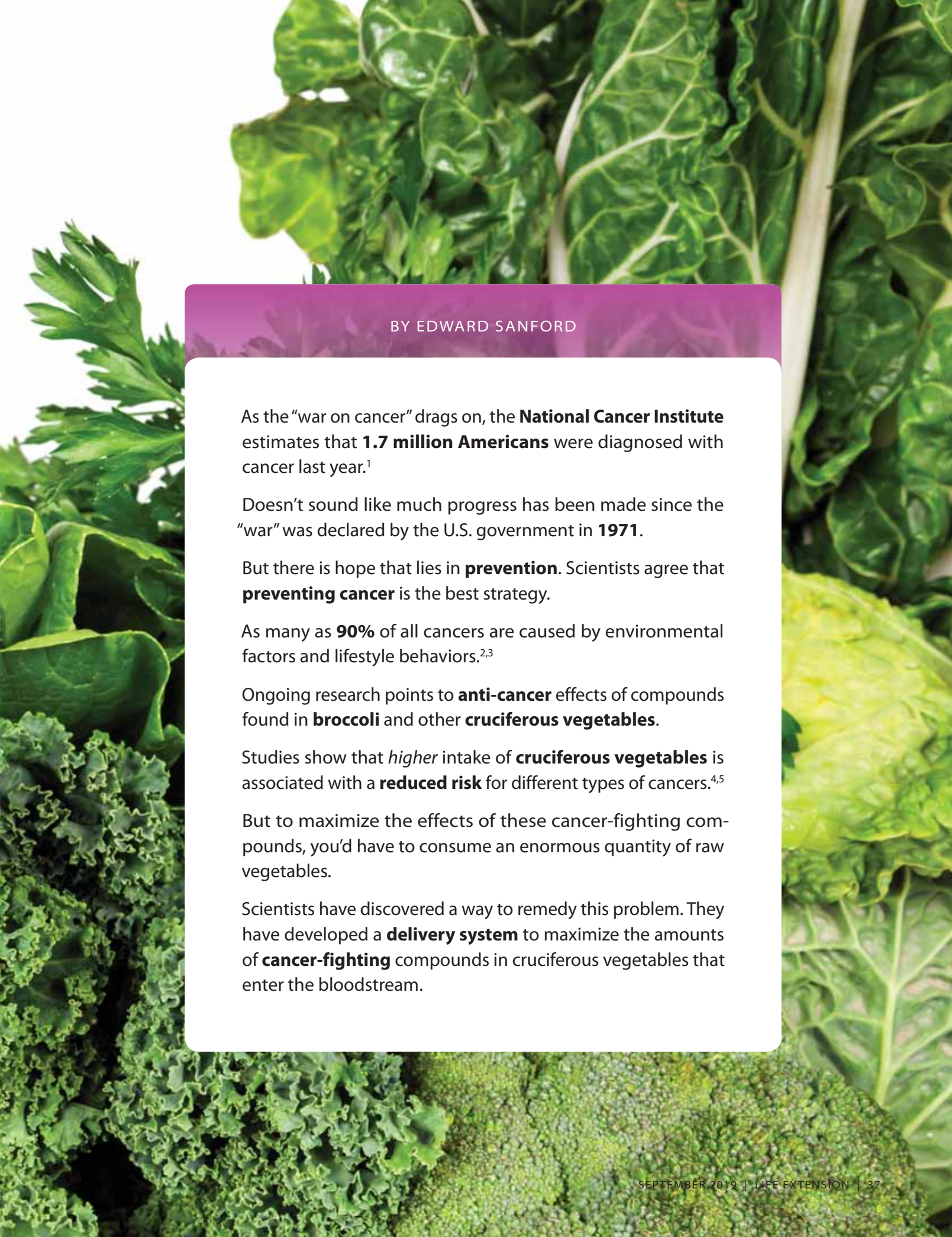
PREVENTION: The Best Strategy *for* Avoiding Cancer





BY EDWARD SANFORD

As the "war on cancer" drags on, the **National Cancer Institute** estimates that **1.7 million Americans** were diagnosed with cancer last year.[1]

Doesn't sound like much progress has been made since the "war" was declared by the U.S. government in **1971**.

But there is hope that lies in **prevention**. Scientists agree that **preventing cancer** is the best strategy.

As many as **90%** of all cancers are caused by environmental factors and lifestyle behaviors.[2,3]

Ongoing research points to **anti-cancer** effects of compounds found in **broccoli** and other **cruciferous vegetables**.

Studies show that *higher* intake of **cruciferous vegetables** is associated with a **reduced risk** for different types of cancers.[4,5]

But to maximize the effects of these cancer-fighting compounds, you'd have to consume an enormous quantity of raw vegetables.

Scientists have discovered a way to remedy this problem. They have developed a **delivery system** to maximize the amounts of **cancer-fighting** compounds in cruciferous vegetables that enter the bloodstream.

Chemistry of Cruciferous Vegetables

Cruciferous vegetables are a group of edible plants that include **broccoli**, **kale**, **green** and **red cabbage**, **cauliflower**, and **Brussels sprouts**.

These vegetables are loaded with nutrients shown to help prevent a wide variety of common disorders.

In particular, cruciferous vegetables have a profound ability to shield cells from several processes that can transform healthy cells into malignant tumors.[4,5]

Two cruciferous nutrients are especially well validated: **sulforaphane** and **3,3'-diindolylmethane** (**DIM**). The benefits of both are supported by ample medical literature.[6-8]

DIM is a stable compound that is readily **absorbed** from the digestive system.

Sulforaphane, however, is very **unstable**, which means it rapidly degrades into non-active substances if it isn't quickly absorbed, or if the vegetable is heavily cooked.

Nature has found a way around this problem.

How Plants Make Sulforaphane

Sulforaphane itself isn't contained in broccoli and cabbage.

Instead, a ***precursor*** called **glucoraphanin** is stored in these plant cells, along with an *enzyme,* **myrosinase**, that ***converts*** the **glucoraphanin** into **sulforaphane**.

In raw vegetables, **glucoraphanin** and **myrosinase** are stored in ***separate compartments***.

Only when the vegetables have been eaten and partially digested do they mix in the body and form **sulforaphane**, the beneficial compound.

Once formed, **sulforaphane** must be absorbed rapidly in the **small intestine** or it will be lost.

A Solution Inspired by Nature

Scientists have found a way to deliver both **glucoraphanin** and **myrosinase,** isolated from broccoli, *separately* to the small intestine.

In the small intestine, these two components *mix* and form **sulforaphane**, which can be immediately ***absorbed*** into the body, achieving *higher* blood levels of this **anti-cancer** compound.

In a study done by scientists at **Johns Hopkins**, healthy individuals were given either **glucoraphanin** alone or in combination with the *enzyme* **myrosinase**. Urinary metabolites of **sulforaphane** were used to assess bioavailability.

The bioavailability of the combination of **glucoraphanin** and **myrosinase** was **35%** compared to **10%** in the group given only **glucoraphanin**.[9]

Sulforaphane and DIM Research

For decades, studies have shown that large dietary intakes of **cruciferous vegetables** reduce the risk of developing different forms of **cancer**, including many of the most common types, such as lung and colorectal cancer.[5,10,11]

Researchers have also evaluated the individual compounds derived from these vegetables, most importantly **sulforaphane** and **DIM**.

Scientists at the **Johns Hopkins University School of Medicine** compared two different groups of rats; one was given **sulforaphane** and one was not.[12] Both groups were then given a potent **carcinogen**, a chemical that produces cancerous tumors at a high rate. They found that the animals given **sulforaphane** developed **39% fewer tumors**. In addition, the tumors that did develop were smaller and grew more slowly.

In **human** cancer cell lines, including breast cancer and leukemia, **sulforaphane** was shown to halt the growth of the tumors and to kill tumor cells.[8]

The benefit of **DIM** supplementation has been evaluated in two studies of women with a history of breast cancer.[13,14] In both studies, women were randomized to receive DIM supplementation (**108 mg** per day in one, **300 mg** per day in the other) or a placebo. DIM was found to significantly alter the mix of **estrogen** types, supporting an increase in "good" estrogen and reducing "bad" estrogen, which is linked to cancer progression.

DIM has also been evaluated in women for prevention of cervical cancer.[6,10] **Cervical intraepithelial neoplasia** is a cervical cancer precursor.

In one study, women with cervical intraepithelial neoplasia were randomized to receive either **100 mg** of DIM, **200 mg** of DIM, or a placebo. After 90 to 180 days of supplementation researchers found that *all* patients' cervical intraepithelial neoplasia **resolved completely** with the **200 mg** dose of DIM. With the lower **100 mg** dose of DIM, **90.5%** regressed.[6]

What this shows is that these compounds, derived from **cruciferous vegetables**, can both *prevent* cancer and *reverse* the progression of cells that are already abnormal.

Cruciferous Vegetables and Cancer

- **Cruciferous vegetables,** including broccoli, cabbage, cauliflower, Brussels sprouts, and kale, are associated with reduced risk of **cancer** and other age-related diseases.
- Two compounds derived from these vegetables, **sulforaphane** and **DIM**, are responsible for most of this anti-cancer activity.
- Large amounts of raw vegetables would need to be consumed to maximize these effects.
- Unlike DIM, sulforaphane is unstable and rapidly degrades if not absorbed quickly.
- Scientists have found a way to deliver glucoraphanin and myrosinase to the intestine to achieve higher levels of the anti-cancer compound sulforaphane.

What You Need to Know

Four Ways Cruciferous Vegetables Protect Against Cancer

Cancer results from damage to genes that causes cells to multiply out of control.

Toxins and pollutants in the air we breathe, the water we drink, and the food we eat can all cause this damage. Even our own metabolism produces oxidative stress and potential toxins.

Behavior such as smoking greatly increases the amount of damage that is occurring.

Methods to decrease **cancer risk** include:

- Protecting DNA genes from mutations (damage)
- Reducing inflammation
- Impairing ability of abnormal cells to propagate

Compounds found in **cruciferous vegetables** act in **four major ways** to prevent cancer.

1. PROTECTING AGAINST EPIGENETIC CHANGES

Cancer can be caused by **epigenetic** changes, the ability to "turn genes on and off." These changes don't alter the DNA, but they change **expression patterns** of genes.

Studies have shown that **sulforaphane** and **DIM** can *reverse* some of these cancer-associated alterations.[15]

Sulforaphane also reverses alterations of **histone** proteins involved in the regulation of genes, another epigenetic change that can contribute to cancer.[16,17]

2. ATTACKING CANCER CELLS

Even after a cell starts down the path to cancer, the progression can be halted or reversed.

DIM and **sulforaphane** have been shown to suppress the **growth of tumors** by interfering with abnormal *signaling* factors that drive cancer cells to proliferate more rapidly.[12]

DIM also slows the propagation of tumor cells by blocking *abnormal* **angiogenesis**, the growth of new blood vessels.[18]

Cancers need ample blood flow to supply oxygen and nutrients so that they can grow aggressively. By impeding this new blood vessel growth, cruciferous vegetables can help starve tumor cells.

DIM and sulforaphane also *directly* kill cancer cells through the process of **apoptosis**, programmed cell death.[19,20]

By *turning on* the genes associated with apoptosis, cruciferous vegetables initiate "suicide" of the abnormal cells, while *protecting* healthy, normal cells.

3. MODULATING SEX HORMONES

Some forms of the hormone **estrogen** can stimulate breast cancer growth in women. By modulating estrogen metabolism, DIM shifts estrogen balance to favor the *healthier* forms of these hormones.[21]

In aging men, **estrogen** balance is also critical. Our early observations revealed that men presenting with benign prostate enlargement or prostate cancer had higher blood estrogen levels.[22,23] Subsequent clinical and laboratory studies helped confirm our early observations.[24-28] DIM can prevent stimulation of prostate cancer cells by estrogen.[29,30]

4. INHIBITING NF-KB

NF-kB (nuclear factor-kappa B) is a regulator in cells that activates inflammation, including the low-grade **chronic inflammation** that is a major contributor to most age-related diseases, including cancer.

Sulforaphane blocks NF-kB, thereby reducing inflammation that contributes to cancer growth.[31]

By reducing NF-kB activity, sulforaphane also has a powerful impact on other chronic diseases, and aging in general. For example, in animal models it can reduce inflammation in the brain that contributes to Alzheimer's and Parkinson's diseases.[32,33]

Summary

High dietary intake of raw **cruciferous vegetables** such as broccoli, cabbage, and cauliflower, is associated with a reduced risk for many types of cancer and other disorders.

Studies have demonstrated that many of the anti-cancer effects are due to two compounds derived from these vegetables: **sulforaphane** and **DIM**.

These cruciferous compounds target cancer at different points in its development and progression, reducing the risk of cancer formation in the first place, *and* halting the progression of some tumor cells.

While **DIM** is stable and easily absorbed when taken orally, **sulforaphane** is rapidly converted to inactive compounds.

To solve this problem, scientists have developed a delivery system (**glucoraphanin** plus **myrosinase**) that maximizes the amount of **sulforaphane** available for absorption into the bloodstream.

By separating these precursor **plant compounds**, much more **sulforaphane** becomes bioavailable in the small intestine. There, it can be rapidly **absorbed**, delivering *higher* blood levels of this **anti-cancer** (sulforaphane) compound. ●

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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Protect Against Age-Related VISION LOSS

BY MICHAEL DOWNEY

Macular degeneration is the leading cause of irreversible **vision loss** in older adults.[1]

It happens when the **macula** loses structural **density**. The result is blinding damage to the light-sensing **retina** of the eye.

Primary culprits like smoking and exposure to ultraviolet sunrays can be controlled.[2-4] But the single, largest factor in its development is **aging**.[5]

Specific **plant carotenoids** have been shown to ***protect the macula*** from UV-light damage and oxidation.[6-10]

Individuals with the ***highest*** levels of the carotenoids **lutein** and **zeaxanthin** show a striking **41% *lower*** risk of advanced age-related macular degeneration.[11]

A corroborating study found that **saffron** improved visual function in **macular degeneration** patients within **three months**. This **visual enhancement** occurred even among those who were *already* using **lutein** and **zeaxanthin**.[11]

Putting the brakes on **macular degeneration** and **improved vision** have been demonstrated in response to several **plant-derived** nutrients.[11-16]

Lutein and Zeaxanthin

Two of the best-known nutrients that protect against age-related vision loss are **lutein** and **zeaxanthin**.[11] They're found in high concentrations in several parts of the eye, including the lens, retina, and macula.[17,18]

These yellow carotenoids absorb higher-energy (blue and ultraviolet) light, preventing it from damaging retinal tissues. Lutein and zeaxanthin also scavenge free radicals and reduce their damaging impact on retinal cells.[17-20]

Several clinical trials have demonstrated their effectiveness. One recent study found a reduced risk of ***end-stage*** macular degeneration, which often causes **blindness**, with moderate consumption of eggs — a naturally rich source of **lutein** and **zeaxanthin**.[21]

Other studies of adults with age-related macular degeneration demonstrated that taking **10** to **12 mg** of **lutein** daily raises the **density** of protective pigmented cells in the retina by up to **175%**, compared with patients taking a **placebo**.[12,13] Increased **macular density** enhances the ability to protect against eye-damaging ultraviolet and blue light.

In patients with ***early*** age-related macular degeneration, 48 weeks of supplementation with either **lutein** alone *or* **lutein** combined with **zeaxanthin** produced significant increases in electroretinogram signals. This is a measure of the power of light-sensitive cells to produce electrical impulses after stimulation by light.[14]

A series of large, clinical trials demonstrates that **lutein** and/or **zeaxanthin** supplementation can improve **retinal function**, increase the ability to see contrasting colors and shapes, and improve **visual acuity** (the sharpness of vision at a distance).[9,11,13,14,22-24]

One study that lasted over **20 years** included more than **102,000 people** aged 50 and older. It adjusted for factors like cigarette smoking and eating patterns.

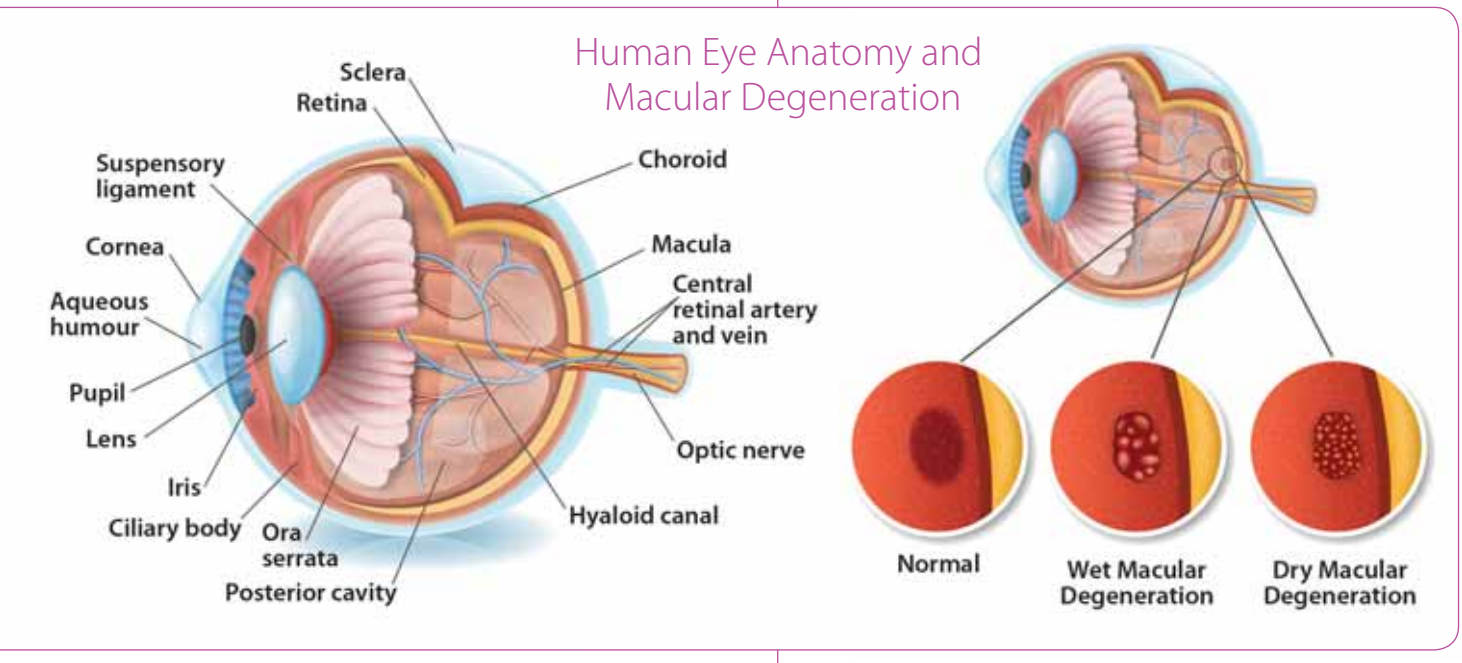
After assessing blood levels of carotenoids, scientists found that those with the *highest* intake of **lutein** and **zeaxanthin** had a remarkable **41%** *lower* risk of progressing to advanced macular degeneration. High intake of lutein and zeaxanthin even protected former smokers, who tend to have a much higher incidence of macular degeneration.[11]

Meso-Zeaxanthin

The damaging effects of UV light are well known. But chronic exposure to **blue light**, the kind given off by TVs, smart phones, tablets, and computers, is also associated with increased risk of macular degeneration.[25-27]

Replenishing the pigments in the eye's protective layer can quench much of the photochemical damage done by this light. In fact, research shows that progression of macular degeneration can be slowed by regular supplementation with **lutein**, **zeaxanthin**, and a third pigment, ***meso*-zeaxanthin**.[28]

Meso-zeaxanthin is a carotenoid needed to maintain the **density** of pigments in the **macula**. When young people consume lutein in their diet, it readily converts to ***meso*-zeaxanthin**.[29]



The importance of *meso*-zeaxanthin is reflected in the composition of macular pigments:

- Lutein **50%**
- Zeaxanthin **25%**
- *Meso*-zeaxanthin **25%**

People with **macular degeneration** have **30% less *meso*-zeaxanthin** in their macula compared to those with good eye health.[30]

When taken as a supplement, ***meso*-zeaxanthin** is *absorbed* into the bloodstream and *increases* macular pigment levels.[8]

Astaxanthin

A reddish carotenoid that can be derived from marine algae, **astaxanthin** helps protect retinal cells from being damaged by oxidative and physical stress.[31-33]

In experimental studies astaxanthin prevented the vision-damaging effects of **wet macular degeneration** that occurs when blood vessels leak fluid into the retina. It can also help prevent cell damage related to increased pressure in the eye, a cause of **glaucoma**.[32,34]

The benefits of astaxanthin, particularly for diabetics, could be substantial. Among people who have had diabetes for over 10 years, **80%** suffer from **diabetic retinopathy**, that occurs when high levels of blood sugar cause progressive damage to the retina. Rodent studies have demonstrated that astaxanthin prevents early death of nerve cells in the retina, resulting from excess blood sugar.[31]

Two human studies demonstrated that the combination of **astaxanthin, lutein,** and **zeaxanthin** significantly improved **visual clarity** in patients, compared with those who were untreated.[35,36]

Saffron

A study published in **2019** found that **saffron**, a culinary spice derived from the crocus flower, enhances **visual function** in patients with ***mild to moderate*** age-related macular degeneration, including those already supplementing with lutein and zeaxanthin.[37]

In this study, individuals took **20 mg** of **saffron** or a placebo daily for three months. Subjects who weren't taking other supplements improved on a standard vision-measuring eye chart by **.69** letters, while those already taking **lutein** or **zeaxanthin** improved by **.73 letters**.[37]

Protecting Your Eyesight

- **Age-related macular degeneration** is the leading cause of vision loss in older adults, and it has no cure.
- Certain carotenoids protect the macula from harmful UV-light damage and oxidation.
- **Lutein, zeaxanthin, *meso*-zeaxanthin, astaxanthin, saffron,** and **alpha-carotene** have been identified as key nutrients that can protect the eyes and slow the progression of age-related macular degeneration.
- **Cyanidin-3-glucoside** enhances night vision, that can be a problem also affecting those with age-related macular degeneration.

What You Need to Know

This report validates earlier research demonstrating that, in people with ***early*** macular degeneration, **saffron** improves both visual acuity, and sensitivity of the retina to light.[15,16,38]

In one study, patients with ***early*** age-related macular degeneration took either **20 mg** of **saffron** or a **placebo** daily. Subjects taking saffron showed stronger electrical responses to light, showing that saffron improved the light-sensing abilities of retinal cells.[16]

The same study found that saffron-supplemented subjects were able to read one entire **additional line** on the eye chart after three months, while placebo subjects did not improve. This means that someone whose visual acuity at a distance was **20/40** prior to supplementation, would be able to see with **20/30** vision afterward.[16]

To determine whether it could produce long-term effects, scientists gave **20 mg** of saffron per day to patients with ***early*** macular degeneration over an average treatment period of **14 months**. Retinal sensitivity remained improved for the entire period, and average visual acuity improved by an astounding **two lines** on the eye chart, showing that ***longer*** supplementation produced even greater improvement.[15]

Alpha-Carotene

Alpha-carotene protects the pigmented cells of the retina from light-induced oxidative damage.

A large study was conducted on 63,443 women and 38,603 men, aged 50 and older. The results showed that people with the *highest* dietary intake of alpha-carotene had a **32%** reduced risk for developing ***advanced*** age-related macular degeneration, compared with those with the lowest consumption.[11]

This yellow-orange carotenoid has even been shown to provide protection for smokers.

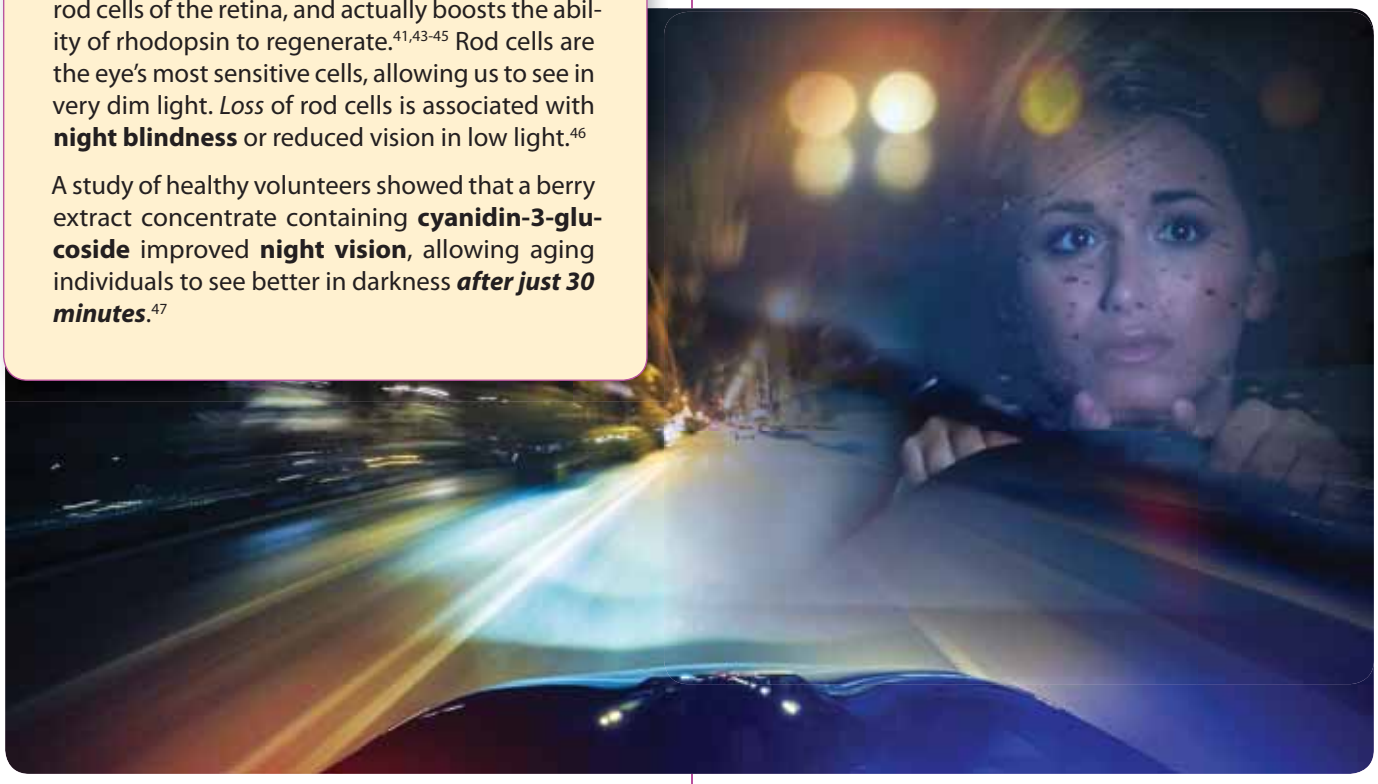
In a recent study, scientists evaluated the dietary intake of carotenoids in 1,414 men aged 65 and over and their incidence of age-related macular degeneration. Current smokers who ate the most foods containing **alpha-carotene** (like pumpkin and carrots) were found to have a significantly *reduced* risk of developing macular degeneration.[39]

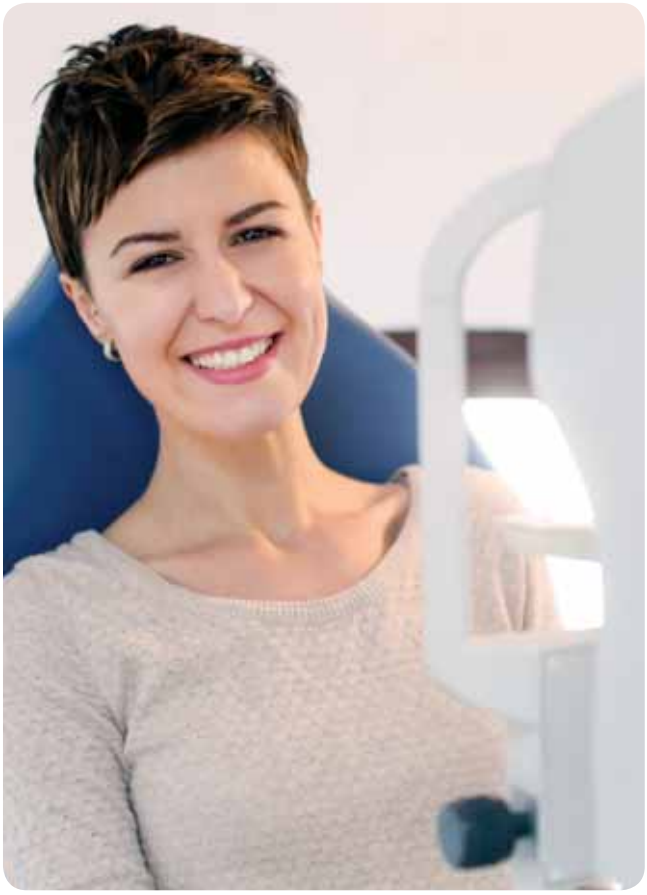
Protect Against Night Blindness

Many individuals with age-related macular degeneration experience difficulties when performing activities at night and under low light, such as driving or reading at night.[40]

A flavonoid found in many berries,[41,42] **cyanidin-3-glucoside** enhances the quality and function of ***rhodopsin***, a light-sensitive protein found in the rod cells of the retina, and actually boosts the ability of rhodopsin to regenerate.[41,43-45] Rod cells are the eye's most sensitive cells, allowing us to see in very dim light. *Loss* of rod cells is associated with **night blindness** or reduced vision in low light.[46]

A study of healthy volunteers showed that a berry extract concentrate containing **cyanidin-3-glucoside** improved **night vision**, allowing aging individuals to see better in darkness ***after just 30 minutes***.[47]





Summary

Macular degeneration is a major threat to aging individuals.

Several **plant compounds** have been shown to protect against many of the underlying causes of compromised vision.

Saffron has been shown to provide protection against ***early*** macular degeneration.[15,16,38]

Alpha-carotene can help protect against ***advanced*** macular degeneration.[11]

Supplementing with an array of these plant compounds including **lutein**, **zeaxanthin**, and ***meso*-zeaxanthin** provides complementary eyesight protection. ●

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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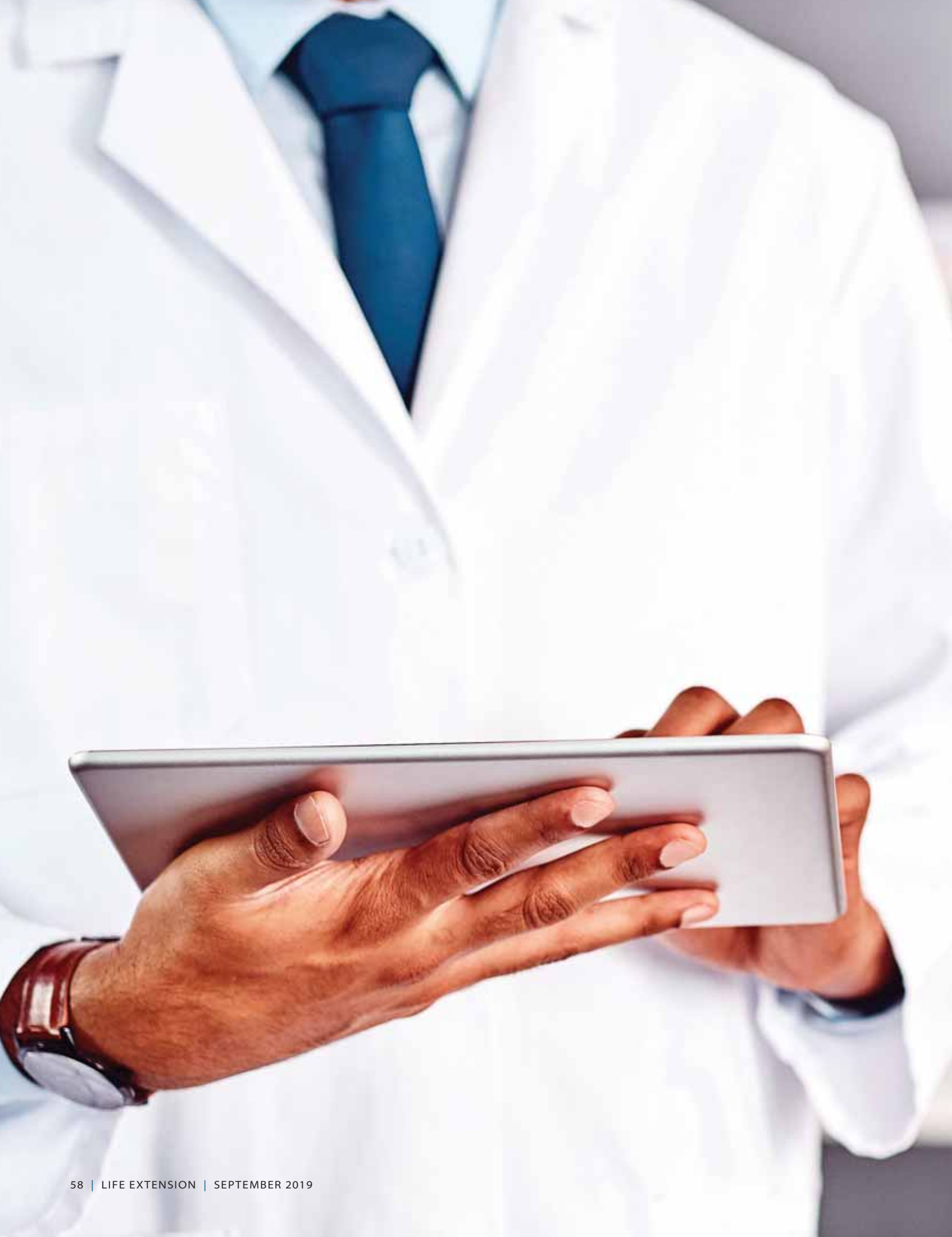


RESEARCH OUTCOMES on Two CANCER DRUGS

BY SHIRLEY GIVENS

The *New England Journal of Medicine* published results from two **clinical trials** of drugs for treating **prostate** and **breast cancer**.[1,2]

The studies showed that both drugs have promise in prolonging survival.

But the gains being made are only baby steps. Despite improvements in care, cancer remains the second most common cause of death in the U.S. and worldwide, closely trailing cardiovascular disease.[3]

Non-Metastatic Prostate Cancer in Men

Androgen-deprivation therapy is a prostate cancer treatment that reduces levels of **androgens**, the predominant sex hormones in men, which include **testosterone**.

This therapy is most commonly done with drugs that prevent testosterone from being produced in the body and/or blocking testosterone from binding to cellular receptor sites. Androgen-blocking therapy works for many prostate cancers because testosterone and other androgens *stimulate* the growth of some tumors.

Some prostate cancers do not respond adequately to this type of treatment and the disease continues to progress.

One of the recent cancer studies focused on men suffering from **non-metastatic (localized) prostate cancer** that doesn't respond to **androgen-deprivation therapy**.[1]

Researchers studied men with *this* type of prostate cancer to evaluate whether the drug, **darolutamide**, could slow the progression of the disease. Darolutamide blocks *receptors* on cells that respond to testosterone.

More than 1,500 men with **prostate cancer** were randomized to receive **darolutamide** or a **placebo**.

Men receiving the drug (darolutamide) **more than doubled** the average metastasis-free survival time, from **18.4 months** with the placebo to **40.4 months** with darolutamide. Men receiving this drug also delayed the progression to pain.

Metastatic Breast Cancer in Women

The second clinical trial studied 694 postmenopausal women with **hormone receptor-positive metastatic breast cancer**.[2]

This type of cancer has *already* spread to distant tissues in the body, a sign of a poor prognosis.

Estrogen receptor-positive breast cancers are characterized by the presence of estrogen receptors in breast cancer cells. These **estrogen receptors** bind to the hormone **estrogen** that then fuels tumor cell growth.

In this study, subjects were randomized to receive either the widely used aromatase-inhibitor drug **anastrozole** or a combination of anastrozole with the drug **fulvestrant**.

Anastrozole blocks an *enzyme* (aromatase) involved in the formation of estrogen, reducing its levels.

Fulvestrant binds to breast cancer cell estrogen receptors, degrading them, which in turn inhibits processes involved with estrogen-fueled tumor growth.[4] The hope was that the **combination** treatment (anastrozole plus fulvestrant) would have a synergistic effect, bolstering the effect of anastrozole alone.

Need for Adjuvant Therapies

The study described in this article shows the additive benefits of combining two anti-estrogen drugs as follows:

ANASTROZOLE
to block formation of **estrogen**
+
FULVESTRANT
to degrade **estrogen-receptor** sites
=
Increased Median Survival

While meaningful by conventional oncology standards, the fact that **71%** of the fulvestrant plus anastrozole group died demonstrates that more needs to be done when battling **metastatic breast cancer**.

To review a comprehensive strategy that breast cancer patients may consider, log on to: LifeExtension.com/breast

Researchers analyzed the results of the study over a period of more than **five years**. The group who received anastrazole with fulvestrant had a median survival of **49.8 months**, which was significantly higher than the **42-month** median survival experienced by the group who received anastrazole alone.

The improvement in survival in the fulvestrant group is even more impressive given that the women received only **half the dose** of fulvestrant than is currently considered to be most effective.

That represents an incremental improvement in the duration of survival with the combination treatment.

Cancer Prevention: An Important Goal

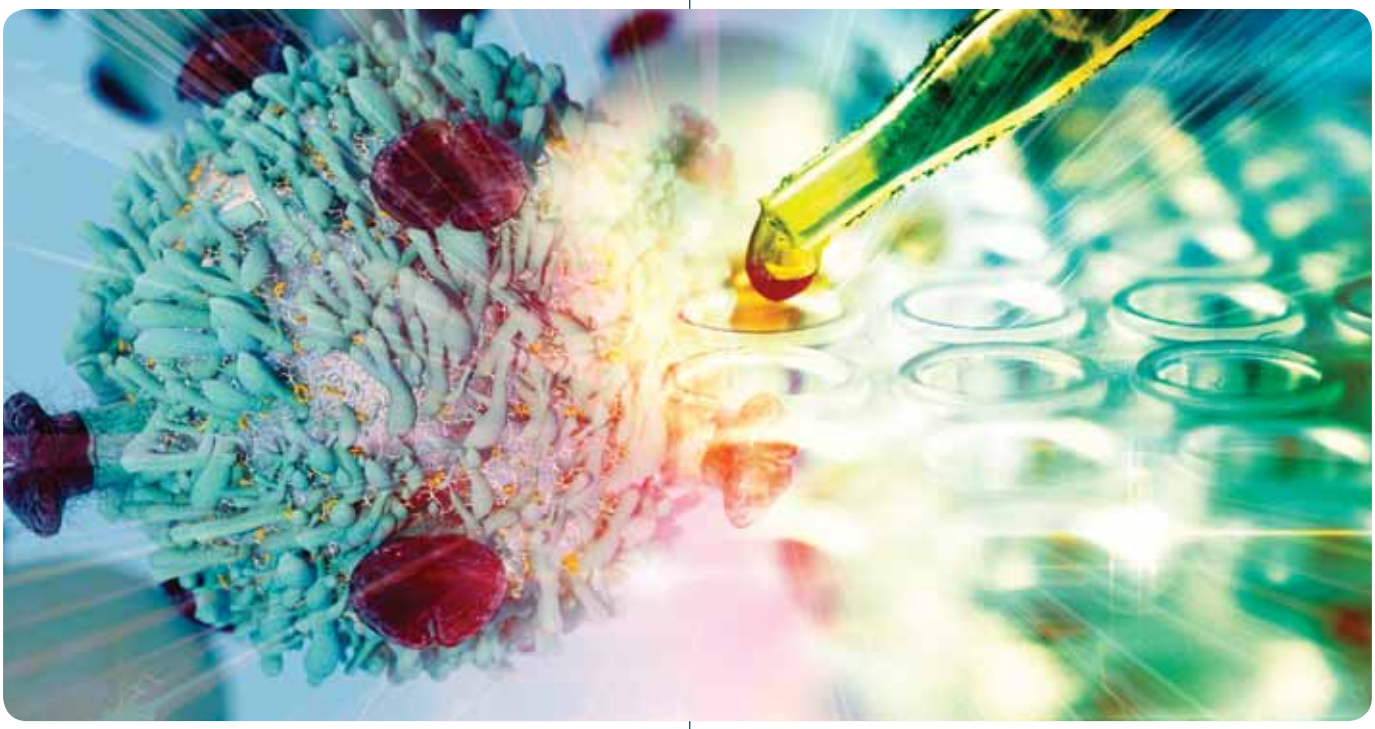
In addition to pursuing more effective treatments, we need to focus on trying to ***prevent*** cancer in the first place.

Scientific research has shown that as many as **90%** of all cancers are caused by environmental factors or lifestyle behaviors, and are therefore potentially preventable.[5-7]

Progress in Cancer Treatment

- **Cancer is the second-leading cause of death, after heart disease, in the U.S.**
- **Two recently published studies showed that novel treatments for two types of cancer were improvements over existing treatment.**
- **A new androgen-receptor blocker drug called darolutamide significantly extended the metastasis-free survival of men with prostate cancer, more than doubling the time to metastasis.**
- **Addition of the drug fulvestrant, which blocks the action of estrogens in the tumor, to treatment with anastrozole in women with hormone receptor-positive metastatic breast cancer extended survival time a modest amount.**
- **Despite these and other recent advances, cancer is still a deadly, and dreaded, disease that affects the lives of many millions of people.**
- **Most cancers are potentially preventable, because modifiable factors such as lifestyle choices, diet, and exercise contribute significantly to reducing risk.**
- **While medical science makes slow improvements in cancer treatment, people can take steps to reduce the risk for developing cancer in the first place, which is crucial to further reducing the burden of this devastating disease.**

What You Need to Know



Many actions can cut the risk of developing cancer, including:

- Not smoking and avoiding secondhand smoke,
- Limiting fried foods and red meat,
- Moderating alcohol intake,
- Increasing exercise,
- Eating more fruits and vegetables,
- Consuming nutrients that reduce inflammation and activate anti-cancer mechanisms.[5]

Summary

Scientists continue to make slow progress in the search for better treatments for cancer.

Two recently published studies demonstrate that two drug treatments resulted in improved survival rates for **prostate** and **breast cancer**.

In one, the drug **darolutamide** for prostate cancer in men **more than doubled** the length of progression-free survival. In the other, women with metastatic breast cancer saw a modest reduction in mortality with a combination treatment with the drugs **fulvestrant** and **anastrozole**.

These improvements are promising but are a long way from a cure. Making lifestyle changes to prevent cancer is vital and even more important for those undergoing treatment or seeking a long-term complete response.

Reducing known causative factors (such as poor diet) slashes one's risk of developing cancer. ●

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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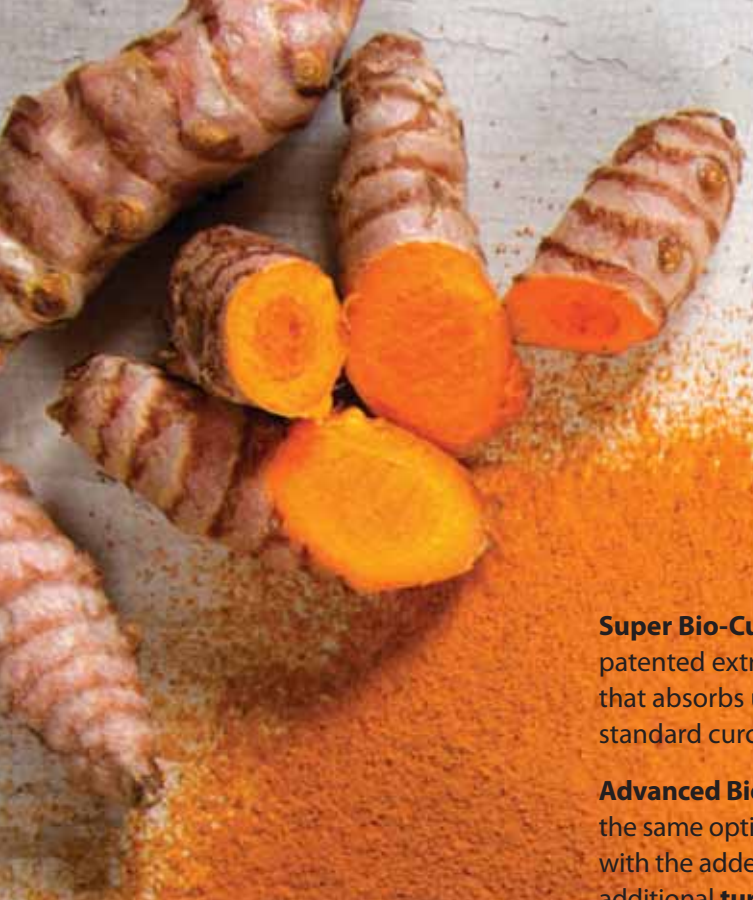

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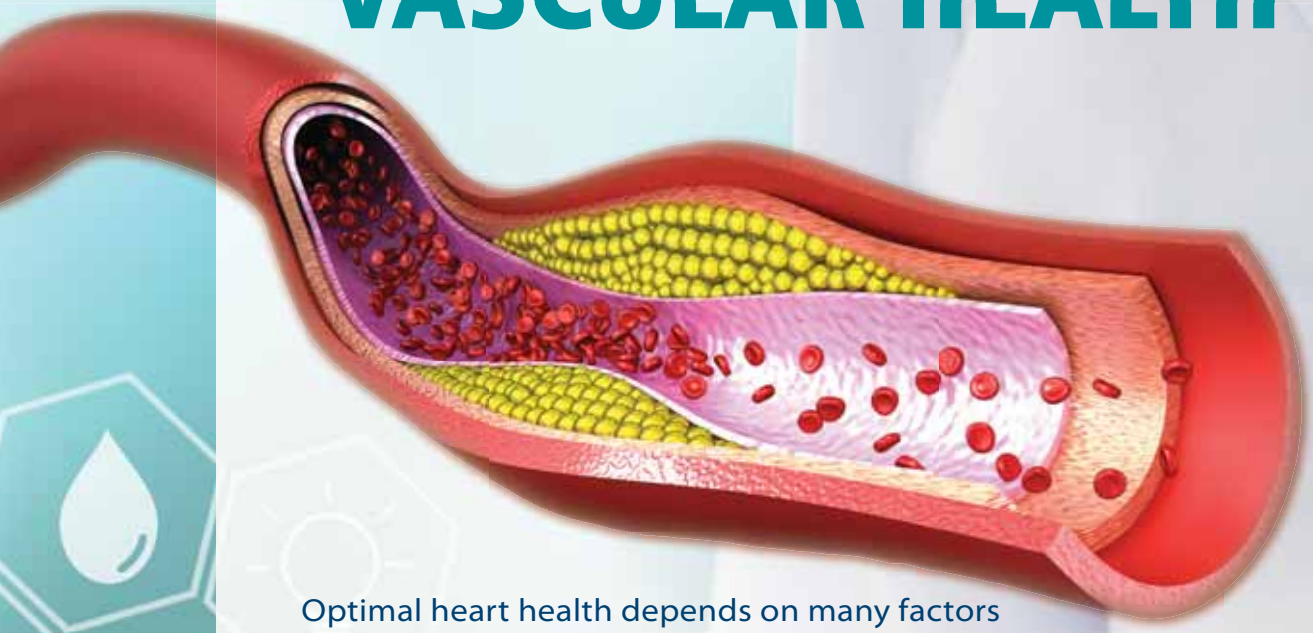

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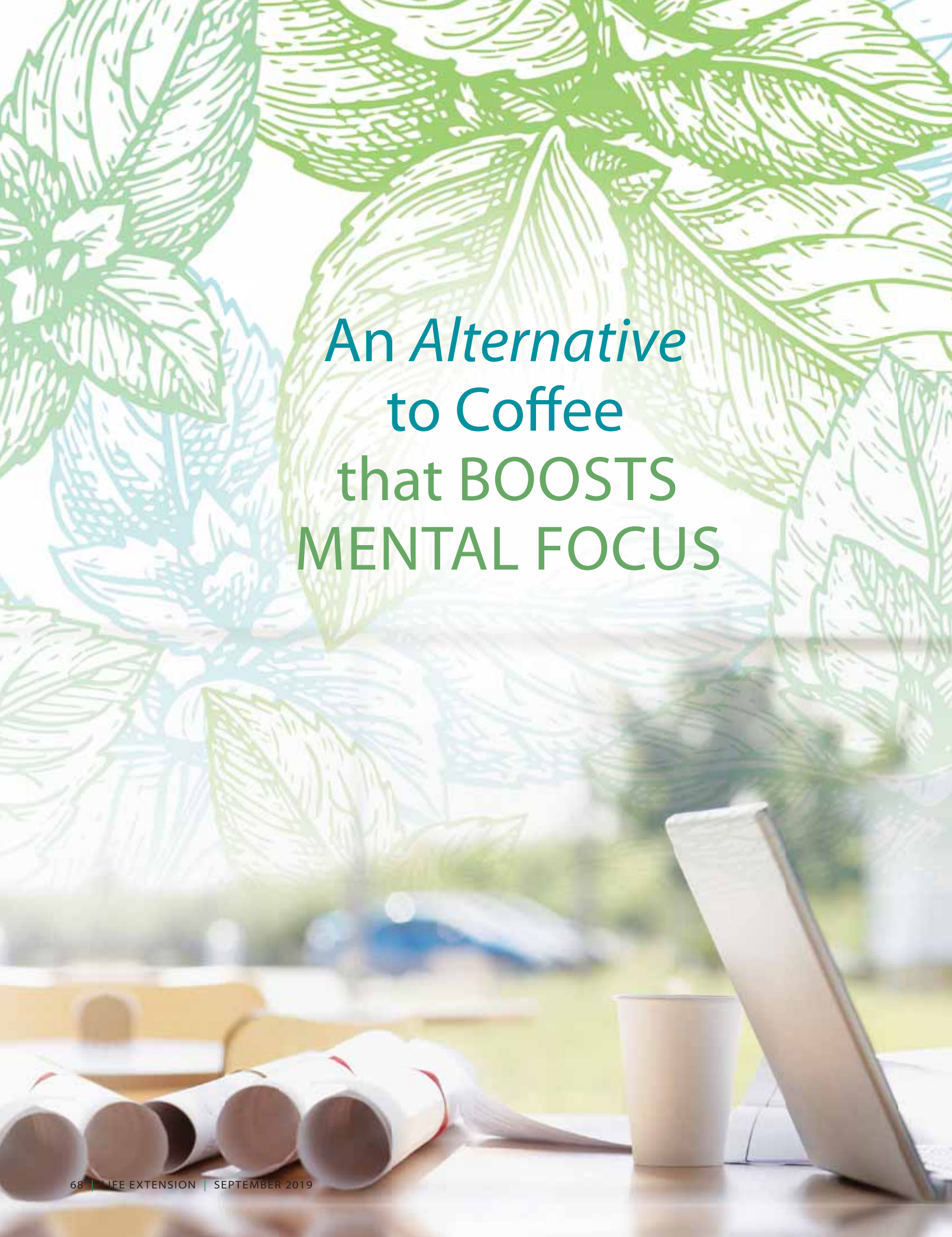
An *Alternative* to Coffee that BOOSTS MENTAL FOCUS



BY MICHAEL DOWNEY

Sometimes you need a way to clear afternoon brain fog.

Coffee can do the trick, but for many people, drinking coffee later in the day can interfere with sleep, upset the stomach, lead to a jittery feeling, and result in a later "crash."

There is an herbal alternative.

Scientists have identified a unique **spearmint extract** that, like coffee, helps the brain **focus**.

It even boosts short-term **working memory**. But it's **stimulant-free** and won't cause *any* of coffee's common side effects.

Available in a convenient, **instant spearmint tea**, this extract contains high levels of **phenolics**, health-promoting compounds found in plants, particularly **rosmarinic acid**.

And this spearmint extract goes beyond offering a ***mental*** boost.[1,2]

A recent, clinical study demonstrated that it also enhances the ability to quickly initiate unplanned changes in direction or speed.[3] This can help performance during exercise or sports, and lead to fewer falls in the elderly.

Staying Mentally Sharp

A majority of Americans are very concerned about staying mentally sharp.[4-6] While many turn to coffee for a daily boost in focus, attention, and concentration, almost two-thirds of consumers report that they are trying to limit their caffeine intake.[4]

In fact, a whopping **64%** of men and women in the U.S., and **74%** of those over 55, drink coffee daily, in part for the short-term increase in focus it provides.[7]

Researchers recognized the need for a drink that enhances **mental focus** as quickly as coffee, while being free of caffeine and other stimulants.

Role of Memory in Mental Focus

Working memory is the part of short-term memory that stores information and allows it to be used even while you're engaged in another mental task. It plays a crucial role in other cognitive abilities that include problem solving and decision making.[8]

If your working memory isn't in top shape, that will make it harder to focus and concentrate.

Add to this the fact that working memory declines about **10% per decade** after age 40, and even faster after age 70.

Nutrients that boost working memory can play a crucial role in being able to focus and concentrate, especially with increasing age.[9]

Also important to cognitive function is **spatial working memory**. That's the ability to recall where items are arranged in space, such as the layout of your home or how to get around town.

Researchers investigated many options, and ultimately found that **spearmint extract** targets **all** these areas of mental focus and concentration.

Supporting Mental Focus

Scientists have demonstrated in various studies that **spearmint extract** enhances the underlying elements of mental focus. It can:

- Boost alertness, mood, and vigor,[1]
- Improve **working memory** *and* **spatial working memory**,[1]
- Improve one's ability to get to sleep at night,[1] and
- In animals, promote the creation of ***new brain neurons***, protect existing neurons, and boost **neurotransmitter** levels.[10,11]

A recent study found that spearmint extract also boosts **reactive agility**, the ability to react rapidly when quick, sudden changes in direction or speed are needed.[3] This type of agility can help prevent falls in the elderly and improve participants' sports and exercise performance.

Spearmint extract's effects for cognitive support have been verified in a range of studies.

Attention, Concentration, and Brain Function

Scientists found that just a single **900 mg** dose of **spearmint extract** led to significant improvements in attention and concentration in human subjects in as little as **2.25 hours**. With longer-term use, over **30 days**, they continued to show these same cognitive benefits.[2]

In one study, 11 healthy adults who were experiencing typical age-related problems with memory took **900 mg** of spearmint extract with breakfast for 30 days. The volunteers were given a battery of computerized cognition tests one hour before taking the initial dose. These tests were repeated after four hours, and again after 30 days.[2]

Four hours after the first dose of spearmint extract, average scores showed:[2]

- **46%** improvement on a task requiring **attention** and **concentration**,
- **121%** improvement on a second task requiring **attention** and **concentration**, and
- **39%** boost in **planning** ability.

Thirty days after the initial dose, average scores demonstrated:[2]

- **35%** improvement on a test of **reasoning**,
- **125%** improvement on a test of **attention** and **concentration**, and
- **48%** boost in **planning** ability.

These findings show that supplementation with spearmint extract has both ***immediate*** and ***longer-term*** benefits for cognitive function.

Next, scientists investigated this extract's effects on a healthy, *young*, and active population. In a double-blind study, 142 healthy, recreationally active men and women were enlisted, who took either **900 mg** of a proprietary spearmint extract each day for 90 days, or a placebo.[12]

Improvements in sustained **attention** were measured at day 30 and day 90. Scores on cognitive tests requiring complex attention were improved at day seven. Response times for correct answers were also faster.

The study authors concluded that this spearmint extract enhances attention and "improves cognitive performance in a young, active population."[12]

Improvement in Working and Spatial Working Memory

Turning to effects on memory, scientists enlisted 90 people, averaging **59.4 years** of age, who had age-associated **memory impairment**.[1]

Participants in this randomized, double-blind, placebo-controlled study took either **900 mg** or **600 mg** of spearmint extract or a placebo every day at breakfast for 90 days. The extract was standardized to contain **24% total phenolics** and **14.5% rosmarinic acid**, one of spearmint's brain-protecting components.[1]

After 90 days, the **900 mg** of extract led to an improvement in **working memory** of approximately **15%** and a **9%** improvement in **spatial working memory**, compared to the placebo.

This suggests, "***that this extract could improve working memory equivalent to that which may have diminished over a decade of life***," the study's authors wrote.[1]

Brain-Boosting Coffee Alternative

- **Phenolic compounds in spearmint extract have been shown in human studies to significantly improve focus and attention, as well as concentration, plus working memory and ability to get to sleep at night.**
- **Preliminary data suggest that spearmint phenolics like rosmarinic acid promote the creation of new brain cells and protect existing neurons.**
- **Recent research on humans shows that spearmint extract also improves reactive agility, the ability to rapidly respond physically.**
- **Spearmint extract does all this *without* caffeine or other stimulants, making it a natural and healthy alternative to coffee.**
- **A spearmint extract delivering high phenolic levels, especially of rosmarinic acid, is now available in an instant, sugar-free spearmint herbal tea. It comes in one-cup, convenient grab-and-go packets for a quick boost in cognitive performance.**

What You Need to Know

Making it Easier to Fall Asleep

The results of this study also demonstrated beneficial effects on **sleep** and **mood**, both of which help support daily attention, concentration, and focus.[1]

Participants in the **900 mg** spearmint group reported improvements in their ability to fall sleep. And they were more alert when they woke up.[1]

The improvements were so pronounced that they were similar to those seen with commonly used sleep aids, researchers noted, but without the negative side effects that often come with them.[1]

In addition to boosting daytime alertness and concentration, these effects might halt the longer-term decline in cognitive health associated with reduced sleep.[13]

Using a standard psychological-rating scale, **improved mood** was observed in those taking **900 mg** of spearmint extract.[1]

Taken together, all these effects can make a huge difference in an individual's mental focus and function.

Promotes Brain Neuron Formation

Beyond improving cognition, the phenolics present in the extract promote ***neurogenesis,*** the formation of ***new brain cells***.[10,11]

In cultures of cells from the **hippocampus**, the brain's center of working memory, spearmint's **rosmarinic acid** significantly enhanced the growth of new cells.[11]

Not long ago it was believed that people stop growing new brain cells after adolescence. But a 2018 study in the journal *Cell Stem Cell* found otherwise.

Postmortem examination of the brains of people who died at various ages revealed that healthy, older individuals without cognitive impairment or neuropsychiatric disease maintain neurogenesis well into old age.[14]

This has changed medicine's view of brain aging. Now that scientists know new brain cells *are* being formed, the focus has shifted to learning how *quickly* an individual produces them. A person's **neurogenic rate** may be vital in determining how well the brain functions and focuses.

Research suggests that **spearmint extract** provides the brain with support to optimize its potential for neuron creation. This can lead to improved focus and long-term cognitive function, and may help those at risk for age-associated memory impairment.[10,11]

Increases Neurotransmitter Levels

Spearmint has also been shown to protect *existing* brain cells and the blood vessels that nourish them.

Phenolics in spearmint inhibit the enzyme ***acetylcholinesterase***, which breaks down the memory-associated neurotransmitter ***acetylcholine***.[15-17]

These phenolic compounds also inhibit harmful oxidative stress.[10,11] One specific phenolic, **rosmarinic acid**, was shown to protect key memory centers of animal brains—such as the hippocampus and cortex—against cellular damage from this stress.[10]

Improves Reactive Agility

In a double-blind study that appears to be the first of its kind, scientists recently assessed the effects of **spearmint** on a connection between mental and physical performance.[3]

They gave 142 healthy, active volunteers, aged 18 to 50, either a placebo or **900 mg** of spearmint extract daily for 90 days. Subjects avoided caffeine for 10 hours before and during the study. Using a special audio-visual device and footplates, researchers evaluated **reactive agility**, the physical ability to quickly react to a stimulus.[3]

At days 30 and 90, the spearmint group demonstrated significantly *greater* reactive agility than the placebo group, showing a faster association between cognition and physical response with spearmint supplementation.[3]

The study's author concluded that the spearmint extract appeared to be safe and have potential benefits for athletic performance.[3]

Another study demonstrated that participants subjectively experienced **energy** improvement. This double-blind experiment involved 10 healthy individuals who had been sleep-deprived for 24 hours, during which time they had participated in very stressful, antiterrorism training.[18]

Unlike the placebo group, those taking **900 mg** daily of the proprietary spearmint extract containing rosmarinic acid reported increased feelings of energy. They also reported experiencing greater attention and focus. However, the researchers found that the overall results were less than conclusive, and called for further study.[18]

A Quick Mental Boost

All these successful, human studies employed **900 mg** of a **spearmint extract** containing more than **50 phenolic compounds**, standardized to **24% total phenolics** and **14.5% rosmarinic acid**.

This same dose of the extract is now available in just **one** serving of a **sugar-free, instant spearmint tea**.

Researchers achieved this high phenol concentration by using a gentle water-extraction process and an innovative drying technology. This preserves the **phenolics** and the **rosmarinic acid** more fully than typical steam-extraction methods.

This herbal tea comes in grab-and-go packets that make one cup of tea in seconds. Just pour the contents into a cup, add hot water, and stir—no steeping required.

This instant refreshment delivers an immediate boost in mental focus and working memory without caffeine, and without the potential for a later "crash."[1,2]

Summary

People seeking an alternative to coffee can now get a quick boost in focus, attention, and concentration with a **spearmint herbal tea**.

Human studies show that **phenolics** like **rosmarinic acid,** abundant in **spearmint**, enhance mental focus and working memory during the day, and improve one's ability to get to sleep at night.

Early lab data suggest spearmint compounds may promote the creation of **new brain cells**.

A human study found that a spearmint extract can also increase **reactive agility**, a brain-muscle reaction that can benefit athletic performance. Another study showed that the extract enhanced feelings of energy.

In human trials the **spearmint extract** has been shown to be safe, without any adverse side effects.[1,2]

Available in one-cup, grab-and-go packets that deliver a high concentration of **rosmarinic acid** and other **phenolic** compounds, this sugar-free, instant spearmint tea provides an ideal, caffeine-free way to quickly increase mental focus while improving cognitive 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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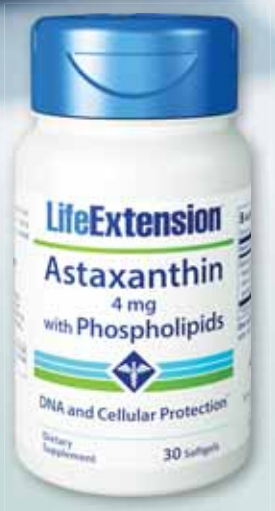

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Storing STEM CELLS to Reduce Cancer Treatment-Related Risks

BY DIPNARINE MAHARAJ, MD, FACP, AND BELLA MAHARAJ

With modern advances in treatment, increased awareness, and developments in early detection, the five-year survival rate for cancer patients is steadily rising.

But successful treatments like chemotherapy and radiation come with an increased risk of blood disorders like **leukemia**.

In other words, treatment for cancer can *cause* another kind of cancer.

Conventional treatments can also damage one's bone marrow, leading to immune system suppression.

But now there's a way for cancer patients to fight back against loss of **bone marrow** stem cells caused by treatment:

Collecting and **storing stem cells *before* receiving chemotherapy** and **radiation therapy**.

Those cells can later be used to boost immune function and fight treatment-induced cancer, if it occurs.

Healthy people can also store stem cells, which can be used to restore the strength of the immune system should illness strike, and to repair damaged tissues and organs.

The Robin Roberts Story

On June 11, 2012, *Good Morning America* co-host Robin Roberts announced that she was facing her second major health battle in five years.

Robin Roberts had been diagnosed with early-stage breast cancer in 2007 and received chemotherapy and radiation therapy to treat it. Then, at 51, she had been diagnosed with **myelodysplastic syndrome (MDS)**.[1]

MDS is a rare and often fatal blood disease in which the **bone marrow** loses its ability to produce mature blood cells, including white blood cells to fight infection and red blood cells to transport oxygen through the body.

MDS following chemotherapy or radiation often transforms into **acute myeloid leukemia (AML)**, a life-threatening blood cancer.

The two diseases are known together as **t-MDS/AML (treatment-related myelodysplastic syndrome** and **acute myeloid leukemia)**. They are significant and serious complications of cancer therapy.

But Roberts overcame MDS with help from a life-saving **bone marrow** and **stem cell transplant** from her older sister. In **2018**, she celebrated the sixth anniversary of the transplant, which she considered to be her sixth "birthday."

This shows the tremendous healing power of **stem cells**. Concentrated in the bone marrow, they can restore the immune system and repair damaged cells, tissues, and organs throughout the body.

The Threat of t-MDS/AML

Patients are often unaware that **t-MDS/AML** are side effects of chemotherapy and radiation treatment for cancer. But the risks are significant.

A study that reviewed 15 years of breast cancer medical records found that women under 65, previously treated with radiation and/or chemotherapy, have a rate of myelodysplastic syndrome that is nearly **11 times** *higher* than the general population and a greater than **five times** *higher* rate of acute myeloid leukemia.[2]

This increased risk of bone marrow disorders occurring after treatment has been found for nearly *all* types of cancer.[3]

A 2018 study of 700,612 adults in a U.S. cancer data registry showed that having chemotherapy increased the relative risk of developing tMDS/AML by as much as **10 times**.[4] This was true for 22 of 23 cancer types investigated (all except colon cancer).

The bad news gets worse. **Myelodysplastic syndrome** and **acute myeloid leukemia** that result from past chemotherapy and radiation can be *harder* to treat than other cases. The outcomes for patients with t-MDS/AML are poor, with shorter survival times than for patients with MDS/AML *unrelated* to chemotherapy and radiation.[5] As a result, there are very few treatment options for t-MDS/AML.

The treatment that Roberts received, a bone marrow/stem cell transplant from a donor, can succeed.

But it's a complicated procedure that carries an increased mortality risk ranging from **23%-61%**. The median overall survival rate from this transplant ranges only from **22%-38%**.[6]

The major complication is a disorder called "***graft versus host***" whereby the donated bone marrow (even from a close relative) begins to viciously attack the recipient's body.

Treatment for graft versus host involves years of immune suppressing therapies (often using high dose **corticosteroid** drugs) and sometimes apheresis UV light therapy to weaken the immune response. This buys a few agonizing years before most patients succumb to the chronic autoimmune attacks *or* the side effects of powerful steroid drugs like **prednisone** and **dexamethasone**.

Robin Roberts defied the odds. She was also incredibly lucky that her sister was a **compatible donor**, which occurs in only **25%-30%** of siblings.[7]

The Benefits of Storing Stem Cells

Many patients will *not* have an optimal donor.

The likelihood of finding an available, compatible donor from national marrow registries varies among different racial and ethnic groups. Whites of European descent have the highest odds (**75%**); black Americans of all ethnic backgrounds have the lowest (**16%-19%**); and Hispanics, Asians, Pacific Islanders, and Native Americans fall in the middle **(27%-52%)**.[8]

For most patients diagnosed with treatment-related MDS/AML, there are *no* suitable options. The best many can hope for is a mismatched donor transplant. But this comes with a high risk of mortality and complications such as **graft versus host** disease.

The statistics are depressing. But there's a *proactive* approach that patients can take so they won't have to rely on finding a donor and going through a risky transplant: **collecting and storing their *own* stem cells**.

This potentially lifesaving procedure is offered at the **Maharaj Institute of Immune Regenerative Medicine** in Boynton Beach, Florida. Cancer patients travel from all over the country and the world *prior* to receiving chemotherapy and radiation therapy, to take advantage of stem cell storage.

By freezing their bone marrow stem cells in the **Stem Cell Cryobank**, cancer patients can save their healthy, immune cell-producing stem cells before they are damaged by chemotherapy and radiation therapy.

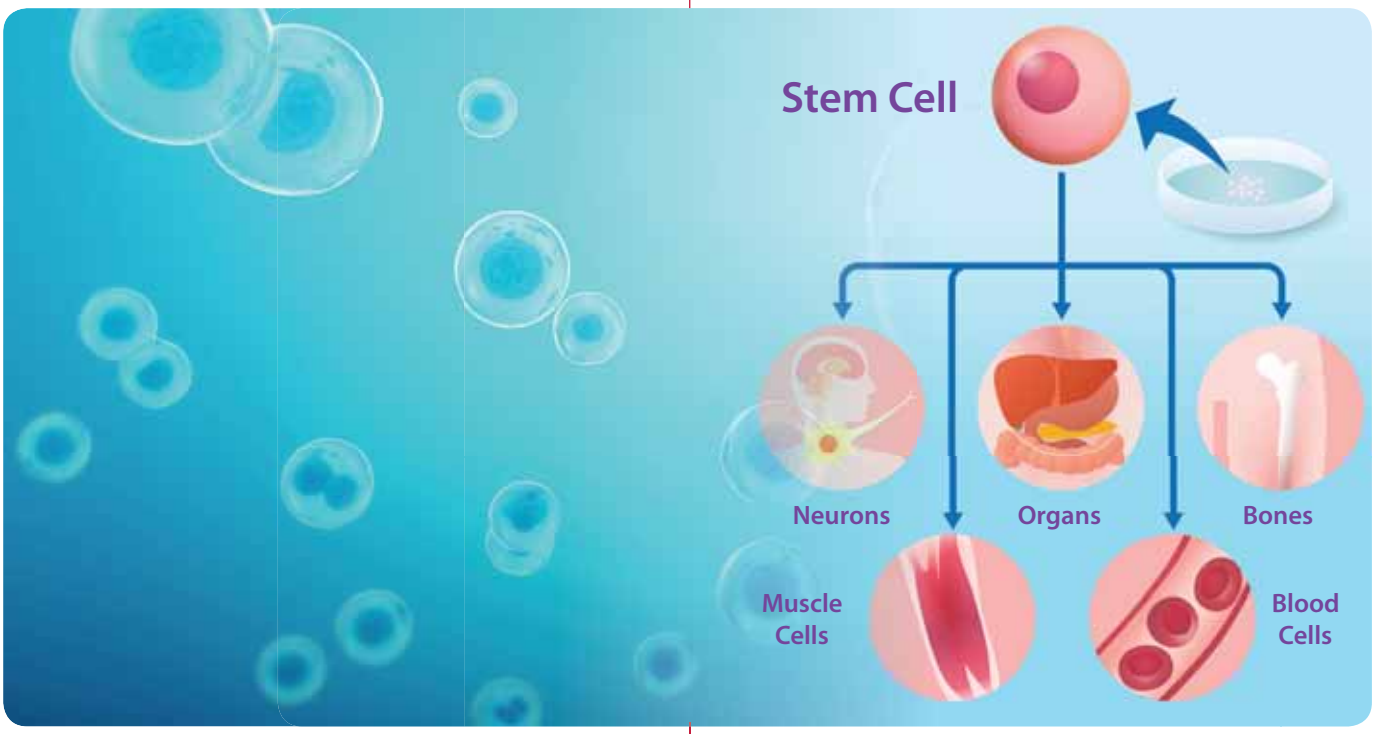
Patients might think there is little value in storing their cells after a diagnosis of cancer, because their

immune system is already compromised. But the process of moving stem cells from the bone marrow (called **stem cell mobilization**) before collecting them from the blood was shown to lead to a **7- to 14-fold increase** in **immune cells** and up to a **400-fold increase** in **stem cells**.[9]

These stem cells can be used for a transplant later. Since they're from a patient's *own* body, they're compatible, leading to the best possible survival outcomes.[10] And there's no risk of ***graft versus host*** disease like there is with a transplant from a donor.

In addition, scientists are constantly developing new and promising **immunotherapies**, such as **chimeric antigen receptor (CAR) T cell therapy**, in which a patient's *own* immune system cells are genetically modified in a lab so they will attack cancer cells.

One limitation of (CAR) T cell therapy is that the numbers of stem cells and immune cells are low when they are collected *after* a cancer patient has received chemotherapy or radiation. If a patient has collected and stored stem cells *before* chemotherapy/radiation, when they are high in number, they are more useful for (CAR) T cell therapy.



A Procedure for *Everyone*

Collecting and storing stem cells isn't just for cancer patients.

Our immune system fights cancer and other diseases. But as we age, our **immune system gradually weakens**. Unfortunately, regular blood tests offered by most physicians do not fully register abnormalities within the immune system.

However, health-conscious individuals can take advantage of advanced methods of measuring their immune systems, giving a better indication of the body's ability to fight disease.

Such testing is available through The Maharaj Institute, which uses a sophisticated **blood test** that examines an extensive array of cellular blood markers, then creates an **Immune Risk Profile** that ranges from no abnormalities to mild, moderate, and severe.

Those with a healthy immune system can collect and store their stem cells in case they are needed to restore their immune health in the future.

For those with an *abnormal* immune system, a **root cause analysis** can identify possible reasons for the weakened system. Once deficiencies are corrected, the procedure continues with the gathering and storage of adult stem cells from the bone marrow, along with a maintenance plan to keep the immune system on track.

Doing this can safeguard health and longevity by providing people with ***two* healthy immune systems**: one in the body and a backup in the **Stem Cell Cryobank**.

Hope for the Future

With an impaired immune system, cancer survivors *and* healthy adults are at an elevated risk for new cancers and other illnesses. They can benefit from measures to correct the deficiencies, have a maintenance plan, and bank and store their stem cells.

When reintroduced into a health-challenged body, adult stem cells taken from the bone marrow have the remarkable potential to **repair the immune system** and to develop and grow into many different, specialized cell types.[11]

As stem cell therapy evolves, so will the number of uses that are available for an individual's **banked stem cells**. With more than 3,000 U.S. clinical trials using adult stem cell therapies, there is growing evidence to show that an individual's own stem cells have the capability for **growth, repair, and regeneration** of damaged cells, tissues, and organs throughout the body.

Currently there are more than 80 medically accepted uses for adult stem cells mobilized from the **bone marrow**, including the treatment of many blood cancers, bone marrow failures, and immune disorders.

Ideally, everyone would have a healthy immune system stored for the future. ●

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

For more information on measuring your immune system, as well as collecting and storing your stem cells, please contact the Maharaj Institute of Immune Regenerative Medicine at ***561-752-5522*** or ***info@miirm.org*.**

Dipnarine Maharaj, MD, FACP, has over 30 years of experience as an internist, hematologist, oncologist, and bone marrow/stem cell transplant physician. He is the Founder and Director of the South Florida Bone Marrow Stem Cell Transplant Institute DBA Maharaj Institute of Immune Regenerative Medicine in Boynton Beach, Florida. Dr. Maharaj is on the Scientific Advisory Board of **Life Extension**®.

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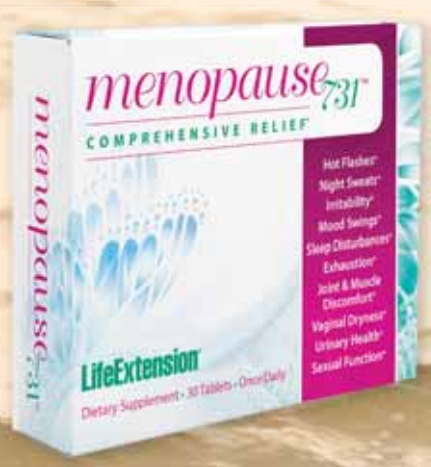

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Jared Firestone

From Stroke Victim to Olympic Hopeful

BY LAURIE MATHENA

When the left side of 23-year-old Jared Firestone's body started going numb, he knew something was terribly wrong.

But he had no idea he was having a stroke.

In his first year of law school at Benjamin N. Cardozo School of Law in New York City, and following a successful college career as a track and field athlete, Firestone thought he was in perfect health.

In reality, a silent, hidden threat had been lurking in his body his entire life.

The day that Firestone suffered his stroke—October 3, 2013—marked a turning point, setting him on a path that would change his life forever.

The Day That Changed Everything

Firestone's symptoms started gradually. First, he noticed that his fingers wouldn't bend when he tried to turn off his morning alarm. He shrugged it off, thinking his hand had just "fallen asleep." But by the time he attempted to brush his teeth, he couldn't use his right arm.

"That's when I sensed something was really wrong," said Firestone.

By the time he called his father, a doctor, he couldn't even form the words to clearly tell him what was happening. But his father had a feeling he might be having a stroke, and told him to get to the hospital right away.

"I thought I'd never be able to feel my body again," said Firestone.

But he was one of the lucky ones.

Rather than having a "regular" stroke, which can lead to permanent disability, Firestone had suffered a mini stroke (also called a transient ischemic attack or TIA), which typically only produces temporary symptoms.

That's because while a stroke is caused by a blockage of blood flow in the brain, in a mini-stroke, that blockage is only temporary, making the symptoms temporary as well.

By the next day, Firestone had regained feeling throughout his body.

Testing revealed that he likely had a tiny hole in his heart. The doctors explained that during one of his heartbeats, a blood clot went out of that hole and up to his brain, triggering his mini-stroke.

Since the hole was too small to fix, Firestone was sent home with instructions to take a baby aspirin daily and to avoid high-stress situations.

But Firestone didn't simply ignore the advice about avoiding stress… *he tossed it out the window.* Because in the years that have followed, he began competing in one of the world's most stressful, high-risk sports – all while completing his law degree.

Finding His Identity

"The stroke made me want to think outside the box," said Firestone. "Being a lawyer is a great thing, but I felt like I wanted to do more."

Firestone's epiphany came a few months after his stroke, when he was watching the Winter Olympics on television, and he saw a sport called skeleton.

Skeleton is a sledding sport that involves a single person on a sled riding face-first down a winding track at speeds up to 80 miles per hour and under 5 G's of pressure. There are no brakes or steering mechanisms on the sled, forcing the rider to steer with body movements alone.

One look at skeleton, and Firestone was hooked.

"I always loved sports, and I had competed in track in high school and in college. That was my identity," said Firestone. "And after the stroke, I realized that was what I wanted to get back to."

But what does a winter sledding sport have to do with running track? As Firestone learned, sprinting is the foundation of skeleton because getting a good time highly depends on the 50-meter sprint at the top of the chute. The speed of the sprint helps build momentum for a faster race down the track.

"You could be the best driver, but if you don't have the speed at the start, you're not going to win," said Firestone.

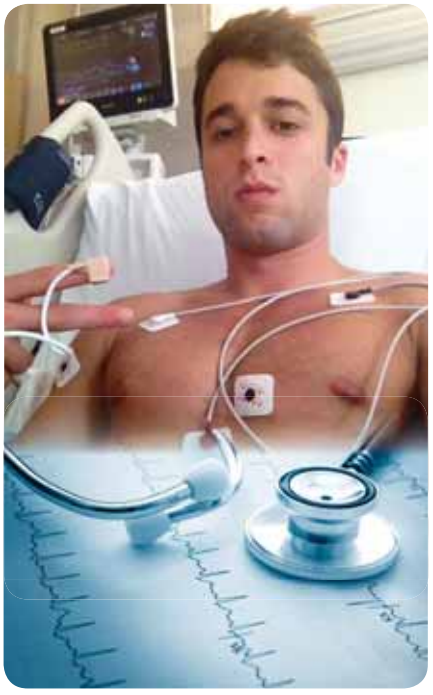
Diving Head-First into Life

Firestone was invited to a sliding school in Lake Placid, N.Y., where he was literally thrown into the sport.

"There are 20 curves in the chute, and they start you at curve 9," said Firestone. "They don't give much instruction other than to not panic and to try to have fun."

The only protections provided to the riders are ski goggles and an open-faced helmet.

"I took some pretty big hits that first week," said Firestone. "I got my nose scraped up, but I was still smiling in the end. That's when I knew this was something I wanted to do."



While finishing law school, Firestone went on to compete in the regional and national skeleton races and came in 12th at the U.S. Nationals race in 2019.

But as Firestone sets his sights on the 2022 Winter Olympics, he won't be competing for a spot on the U.S. team. He'll be racing to represent another country: Israel.

After making a name for himself on the U.S. team, Firestone was approached by AJ Edelman, Israeli Olympic skeleton racer in the 2018 Winter Olympics, about racing for Israel.

It was an easy decision.

"I've always had a strong connection to the Jewish community. I went to Jewish day school growing up, and I've been to Israel numerous times. Being able to represent Israel was something that was important to me," said Firestone.

After three years with the U.S. team, Firestone obtained his Israeli citizenship. Now, starting this October, he'll be donning the signature Star of David from the Israeli flag.

Preparing to Be the Best

As Firestone looks to the 2022 Winter Olympics, he prepares his body with a balance of training and conditioning, rest, and supplementation.

"The sport is pretty demanding because it takes both a physical and mental toll on you," said Firestone. "In addition to the physical beating you might take while sliding, you train like a sprint athlete at the same time."

In the off season, Firestone focuses on workouts that build up strength and conditioning. During the competition season, he focuses on allowing his body to rest and recover from the races. He also incorporates specific supplements into his routine.

For example, because Firestone has problems with cramping, he takes hydration products with electrolytes. "These help me with my endurance, and give me the confidence that I won't cramp," he said.

Since he has a fast metabolism, he takes omegas-3, 6, and 9 in order to give him the energy he needs to get through his workouts.

In addition to a multivitamin, he also takes mushroom extract, glutamine, and bone broth protein – various supplements that he says help provide natural energy and help him focus.

A Deeper Message

While making it to the Olympics would be the biggest accomplishment of Firestone's life, his message extends beyond his own personal goals.

Growing up, Firestone saw the 2005 movie, "Munich," produced and directed by Steven Spielberg, which tells the tragic, real-life story of a Palestinian terrorist group that infiltrated the Olympic Village in West Germany in 1972 and murdered 11 members of the Israeli Olympic team.

"Being able to represent Israel on the world stage would bring me so much pride," said Firestone. "To me it is extra special because of being able to make the statement that we're not going away. Terrorism is not going to scare us.

"That belief resonates throughout sports, history, and life," said Firestone. "Now that I'm representing Israel, spreading that message makes me more motivated than ever to do this."

Sacrifices are Worth It

Following your dreams is never easy. It takes time, dedication, sacrifice, and as they say in Israel, *chutzpah*.

For Firestone, it has meant putting his law career on the back burner. The competition season lasts six months, and, as Firestone explains, no firm is willing to hire someone who is going to be away for half the year.

While the Israeli Skeleton Federation has been around for 16 years, they don't have a lot of resources, which means the burden of the sport's expenses – which run in excess of $30,000 per year – falls to Firestone.

"I knew when I made this choice to compete for Israel that I couldn't have a life focused on my legal career, traveling, or hanging out with friends," said Firestone. "There are sacrifices, but to me it's worth it."

Firestone works as a realtor and has started his own private law firm so that he can take on various legal work during his off season. He's also actively looking for sponsors.

"Making it to the Olympics would be the ultimate accomplishment for myself," said Firestone. "But on top of that, being able to bring joy and pride to my community here and around the U.S. and Israel makes all the hard work and sacrifice worth it." ●

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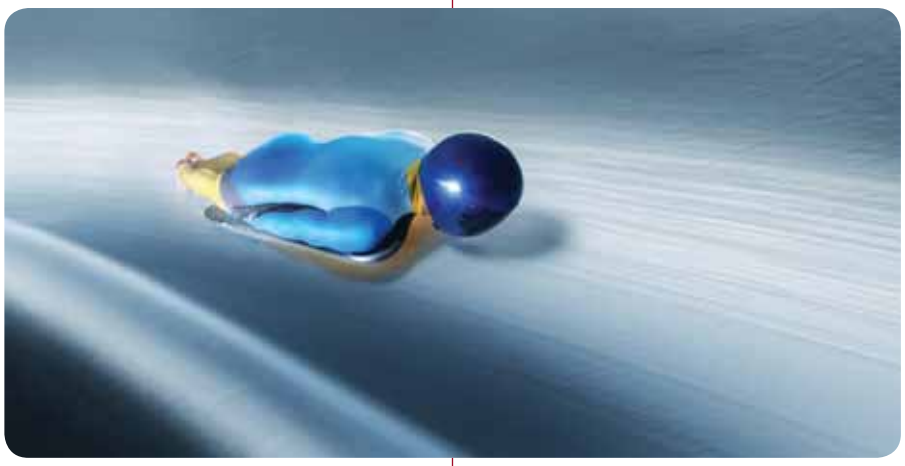

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Cabbage

BY LAURIE MATHENA

Cabbage may resemble lettuce, but that's where their similarities end. While lettuce contains more water, cabbage (a part of the cruciferous family of vegetables) has **twice** the amount of dietary fiber, plus more protein.

There are at least 15 different varieties of cabbage that range in color from green to red to purple, and their leaves can be either smooth or wrinkled. There are many reasons to include cabbage as part of a healthy diet. Consuming cabbage can contribute to one's overall health.

Traditionally, in folk medicine, cabbage has been used to help treat a range of health problems, including constipation, headaches, and skin disorders.

More recent research has revealed that it contains compounds that can help protect against the dangers of cancer, radiation therapy, and heart disease.

Heart Health

Cabbage—especially red cabbage—contains a type of flavonoid called **anthocyanins**, which are the pigments that give cabbage its bright purple color. Eating foods higher in anthocyanins has been linked to a reduced risk of heart disease.[1]

Higher anthocyanin intake has also been associated with lower **arterial stiffness** and lower **central blood pressure** in women.[2] Arterial stiffness contributes to cardiovascular diseases, and is associated with systolic hypertension, coronary artery disease, stroke, heart failure, and atrial fibrillation—all leading causes of death.[3]

Cancer Prevention

Studies have shown that cabbage contains compounds that can help prevent numerous types of cancer, including breast, prostate, bladder, and colon cancers. This is due in part to the numerous anti-cancer activities of these compounds, which include stimulating the activity of enzymes that inhibit tumor growth.

Gut Health

Cabbage can help improve digestive health because it is a good source of ***insoluble* fiber**, which helps add bulk to stools and promotes regular bowel movements. It also contains ***soluble* fiber**, which can help increase good bacteria in the gut.

At less than 20 calories per half cup, cabbage makes an excellent addition to a healthy diet. It is perhaps best known as the main ingredient in coleslaw. It also tastes good sliced, brushed with extra virgin olive oil, sprinkled with salt and pepper, and roasted in the oven.

References

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2. *Am J Clin Nutr.* 2012 Oct; 96(4): 781-8.
3. *Acta Pharmacol Sin.* 2010 Oct;31(10):1267-76.

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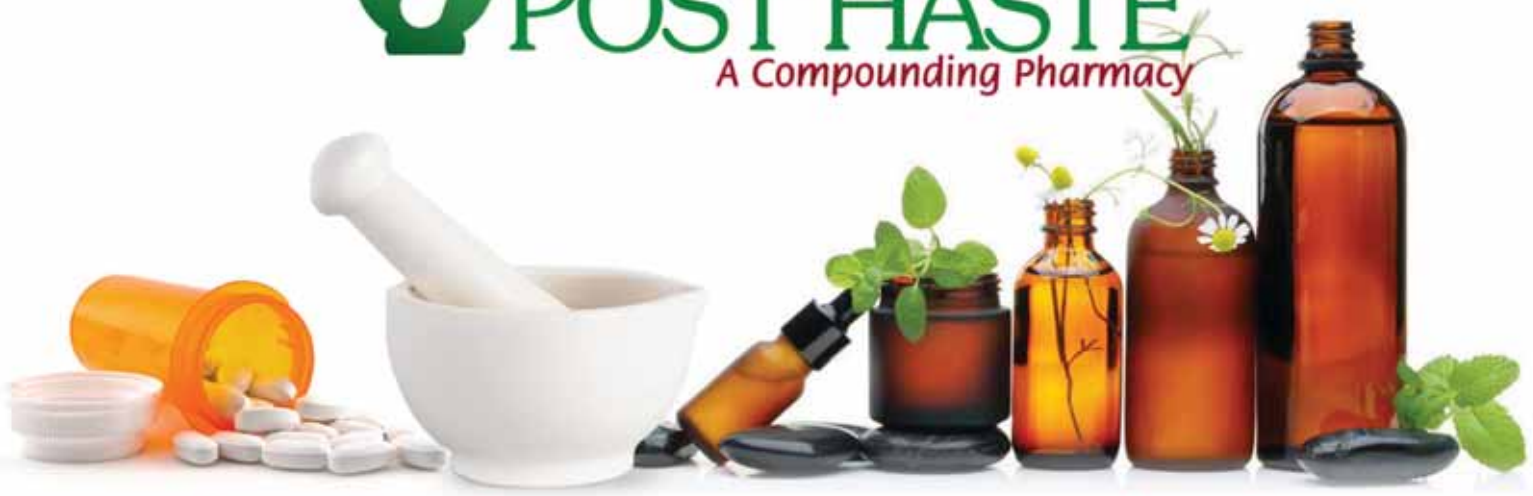

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