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October 2021

Volume 27 • Number Ten

Publisher • LE Publications, Inc.

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Life Extension • 3600 West Commercial Blvd., Ft. Lauderdale, FL 33309
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Customer Service: 800-678-8989 • Email: customerservice@LifeExtension.com

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Life Extension® Magazine values your opinion and welcomes feedback.

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

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LIFE EXTENSION (ISSN 1524-198X) Vol. 27, No. 10 ©2021 is published monthly except bi-monthly in April by LE Publications, Inc. at 3600 West Commercial Blvd., Fort Lauderdale, FL 33309-3338. LE Publications, Inc. All rights reserved. Published 13 times a year. Subscription rate: \$40 per year in the United States. US \$47 in Canada. US \$60 in other countries. Mail subscriptions or address changes to: LE Publications, Inc., P.O. Box 407198, Fort Lauderdale, FL 33340-7198, USA. Or phone us toll-free at: 1-800-841-5433. Canada Subscriptions: Publications mail agreement number 40028967. Return undeliverable Canadian addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill, ON L4B4R6. You will be sent your first issue within six weeks after LE Publications, Inc. receives your subscription fee. Periodicals Postage paid at Fort Lauderdale, FL and at additional mailing offices. POSTMASTER: Send address changes to Life Extension, P.O. Box 407198, Ft. Lauderdale, Florida 33340-7198, USA. Printed in USA. The articles in this magazine are intended for informational purposes only. They are not intended to replace the attention or advice of a physician or other health-care professional. Anyone who wishes to embark on any dietary, drug, exercise, or other lifestyle change intended to prevent or treat a specific disease or condition should first consult with and seek clearance from a qualified health-care professional. LEGAL NOTICE: Health claims contained in articles and advertisements in this publication have not been approved by the FDA with the exception of FDA-approved, qualified health claims for calcium, antioxidant vitamins, folic acid and EPA and DHA omega-3 fatty acids, and selenium as noted where applicable. *Life Extension® Magazine* does not endorse any of the businesses or the products and/or services that may appear in advertisements for non-Life Extension branded products or services contained in it, except to state that they are advertisers who may have paid Life Extension for placement of an advertisement in this publication. Life Extension disclaims any and all responsibilities or warranties as to the accuracy of information contained in advertisements for non-Life Extension branded products or services. For Canadian customers send change of address information and blocks of undeliverable copies to P.O. Box 1051, Fort Erie, ON L2A 6C7.

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THE ANTI-CANCER EFFECTS OF BROCCOLI



WILLIAM FALOON

In 1992, researchers at Johns Hopkins discovered robust **anti-cancer** properties of a **broccoli** compound called **sulforaphane**.¹

One study demonstrated a **61% reduction** in **tumor incidence** in lab rats given high-potency **sulforaphane** compared to controls.²

The media reported on these findings and predicted **sulforaphane** would soon become available to **prevent** and help **treat** certain malignancies.³

Here we are nearly **30 years** later, and **conventional oncology** remains in the dark about this natural plant compound. Few understand what is needed for **sulforaphane** to be **absorbed** into their bloodstream.

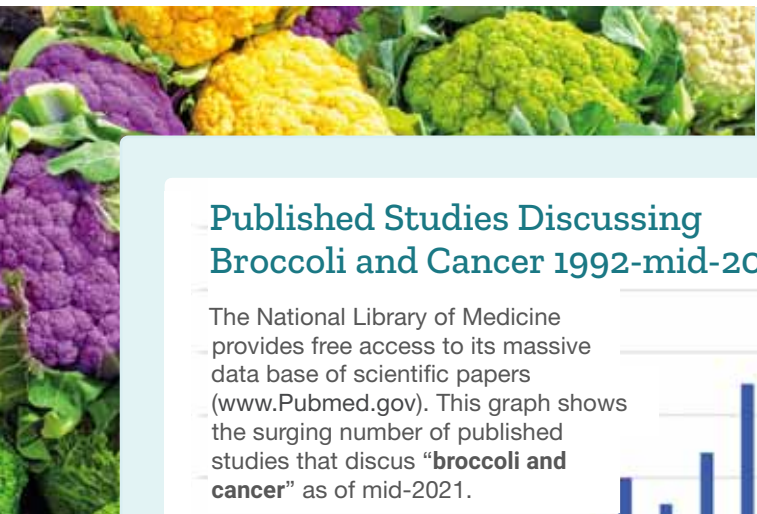
What has not stopped is an avalanche of scientific studies showing greater **anti-cancer** effects than originally anticipated.

When seeking better ways to prevent and treat **head and neck cancers**, I searched the **National Library of Medicine's** website (www.Pubmed.gov).

I was astounded to see the volume of published research about **sulforaphane's** potential ability to reduce risks of many different **cancers**.

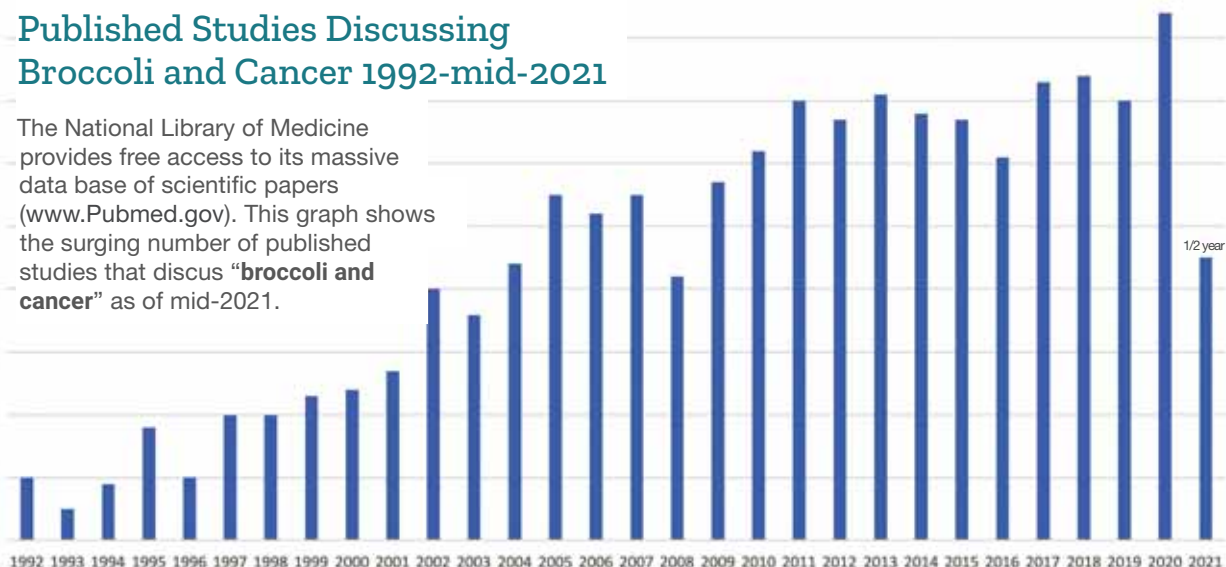
The box on this page shows the surging number of studies between **1992** and **2021** on the **federal government's** website that discuss "**broccoli and cancer**."⁴

I succinctly describe some of these findings in this editorial.



Published Studies Discussing Broccoli and Cancer 1992-mid-2021

The National Library of Medicine provides free access to its massive data base of scientific papers (www.Pubmed.gov). This graph shows the surging number of published studies that discuss "**broccoli and cancer**" as of mid-2021.



There may be no greater a defining moment in one's life than a **cancer diagnosis**.

All kinds of treatment choices are available, usually **toxic** in the near and long term, with no guarantee of a complete response.

Upon diagnosis, a patient often forfeits their personal freedoms in order to be **treatment compliant**.

In essence, the cancer and rigorous therapies control every aspect of the patient's schedule, along with taking a relentless toll on their physical, financial, and emotional wellbeing.

Proven strategies exist to **lower** one's risk of developing a malignancy. Yet these methods are disregarded by most of the world's population.⁵⁻⁷

Dietary intake of **cruciferous vegetables** like **broccoli** and **cauliflower** have demonstrated cancer risk reductions.⁸⁻¹⁰

Compelling studies reveal that **sulforaphane** may be the most potent **anti-cancer** compound in these vegetables.^{1,11,12}

Additional research findings describe how people can deliver **high levels** of **sulforaphane** to cells throughout their body.



What Makes Cancer Cells Treatment Resistant?

Cancer cells are everything we would like our healthy cells to be.

They quickly adapt to toxic environments (such as chemo drugs), they readily alter themselves to assure continued survival, and they utilize genetic mechanisms to promote cellular immortality.

All of these factors make cancer difficult to treat.

Sulforaphane long ago demonstrated cancer preventive properties in cell culture and in mammals via multiple mechanisms.

Recent studies suggest that **sulforaphane** favorably regulates key **genes** that influence the **initiation** and **progression** of cancer. These data led to a study published in **2018** that concluded:¹³

*“This research may provide a basis for the clinical use of **sulforaphane** for cancer chemoprevention and enable us to design preventive strategies for cancer management, reduce cancer development and recurrence, and thus improve patient survival.”*

These data were bolstered by a **2020** report describing how **sulforaphane** impacts the function of **microRNAs** by tumor cells.¹⁴

MicroRNAs are small stretches of genetic material involved in biological processes that include cell cycle regulation, proliferation, apoptosis, and differentiation.¹⁴

Impairment in the expression and function of **microRNAs** has been associated with cancer risk.¹⁴

Sulforaphane beneficially regulates **microRNAs** in ways that interfere with survival mechanisms used by cancer cells to escape eradication.¹⁴

Head and Neck Cancer Outbreak

Incidence of **head and neck cancer** has increased **300%** in men over the last two decades.^{15,16}

Tobacco used to be the main culprit, but a major underlying cause today is infection with the **human papilloma virus (HPV)**.¹⁷⁻¹⁹

Some encouraging news for non-smokers is that **HPV-induced head and neck cancers** respond much better to conventional treatments. These treatments, however, are often harsh, and radiation-inflicted pain can persist for months.

A study conducted in Taiwan adjusted for common risk factors (alcohol/tobacco) and found the following associations between **head and neck cancer** risk and intake of fruit and vegetables:²⁰

- Daily intake of **vegetables**: **56%** risk reduction
- Daily intake of **fruit**: **45%** risk reduction

Individuals with no intake of fruit and vegetables had more than double the risk of **head and neck cancer** compared to daily **fruit/vegetable** intake.

This study is consistent with others showing **protective effects** in response to *higher* ingestion of plant foods.²¹⁻²⁴

One study found those who smoke **cigarettes** and eat **processed meats** had nearly **triple** the risk of **head and neck cancer**. This same study observed decreases in **head and neck cancers** in response to *higher* **fruit** and **vegetable** intake.²⁵

HPV infection adds yet another *risk factor* for head and neck cancer.

In fact, in many developed countries, **HPV** is by far the most important risk factor for primary oropharyngeal squamous cell carcinoma, even exceeding smoking and alcohol.²⁶

Evidence Supporting Preventative Role of Sulforaphane

Chronic exposure to **carcinogens** (such as tobacco) is a risk factor for head and neck malignancies.

A group of researchers initially examined the impact of **sulforaphane** on normal mucosal cells and head and neck cancer cell lines.²⁷

They went further and performed a study on a mouse model of oral cancer. This was followed by a pilot trial on 10 healthy volunteers, to investigate bioavailability and pharmacodynamic properties of three different **broccoli-sprout** preparations.

In the cell-line portion of the study, researchers demonstrated that treatment of both normal and head and neck cancer cells with **sulforaphane** turned on genes involved in the **detoxification** of known carcinogens.

Compared to controls, ingestion of **sulforaphane** significantly reduced the incidence and size of toxin-induced **tongue tumors** in mice.

When **humans** were administered different broccoli-sprout preparations, in up to **66%** of the study subjects, there was a **2-fold** or greater upregulation of a **gene** involved in **detoxification** reactions.²⁷



Enhancing Cell-Killing Impact of Conventional Therapy

Radiation therapy is debilitating, but it enables significant numbers of **head and neck cancer** patients to achieve complete responses and outright cures.

A cell culture study found that when **sulforaphane** was combined with **radiation** (cancer cells were pre-treated with sulforaphane before being irradiated), there was a stronger inhibition of proliferation and survival of **head and neck cancer** cells.²⁸ The authors of this study concluded that **sulforaphane** is a promising agent in the **treatment of head and neck cancer** due to its antiproliferative and radiosensitizing properties.

My complaint here is, it was published in **2011** and I've yet to hear of a **radiation oncologist** advising **head and neck cancer** patients to fortify their diet with **sulforaphane-precursor** foods or supplements.

Photodynamic therapy is another method to treat cancers using photosensitizers and light. It is particularly effective in early-stage oral cancers.²⁹

The clinical application of this therapy is limited by the toxicity of the photosensitizer and narrow therapeutic effects against fully developed malignancies.

A study measured the effect of **photodynamic therapy** combined with **sulforaphane** on human head and neck **cancer cells**.

Pre-treating cancer cells with **sulforaphane** before photodynamic therapy significantly decreased cellular viability and increased apoptosis (cell death) in these human head and neck cancer cell lines.²⁹

This study was published in **2015**. I have yet to hear of an oncologist advising **photodynamic-treated** patients to increase their intake of **sulforaphane precursors**.

Attacking Cancer Stem Cells

Healthy **stem cells** perform essential regenerative functions throughout one's body.

Cancer stem cells, on the other hand, give rise to malignant cells that then propagate on their own. Cancer **stem cells** are highly resistant to conventional treatments and are an origin of tumor **metastasis**.³⁰

While conventional therapies readily kill offspring malignant cells, surviving **cancer stem cells** produce new cells that are often treatment resistant. It's a major reason why even **pancreatic cancers** initially regress in response to **chemotherapy**, but then come raging back virtually invulnerable to further toxic treatments.³¹

A study published in **2020** tested **sulforaphane** in combination with **chemotherapy** drugs against human head and neck cancer **stem cells**.³²

The study found that **sulforaphane** reduced viability of the **cancer stem cells** in a time- and dose-dependent manner.

Combining sulforaphane with the chemo drug **cisplatin** increased **cancer stem cell** cytotoxicity by **2-fold** and by **10-fold** when combined with the chemo drug **5-fluorouracil**, compared to sulforaphane alone. There was no toxicity to non-cancerous stem cell function and viability.³²

The conclusion of this study was that combining **sulforaphane** with lower doses of the toxic **chemo drugs** might enhance cytotoxicity against human head and neck cancer **stem cells**.

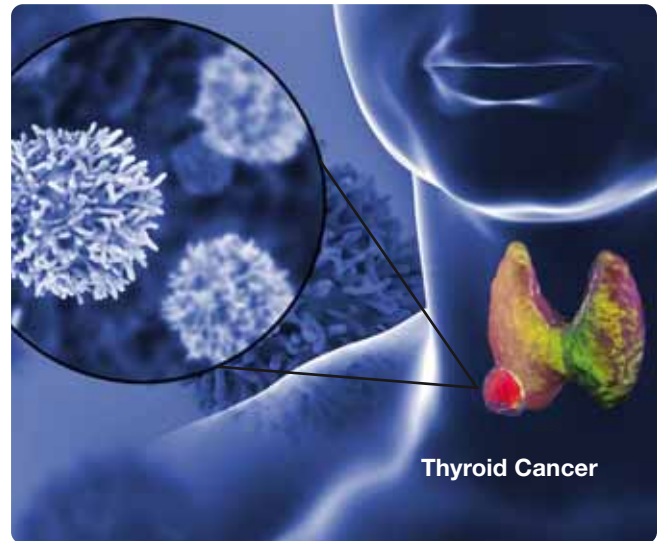
Cancer stem cells are driving forces in **head and neck cancers** of the oral cavity.³³

A study published in **2017** looked at the effect of **sulforaphane** on oral cancer **stem cells**. Sulforaphane treatment of these **cancer stem cells** decreased the migration, invasion, clonogenicity, and *in vivo* tumor formation when these cells were grafted into whole animals.³³

The scientists attributed some of the benefits of **sulforaphane treatment** to a dose-dependent increase in the levels of a tumor suppressive **microRNA**.

The authors concluded that these lines of evidence suggest that **sulforaphane** can suppress **cancer stem cell** viability and tumor-initiating properties both *in vitro* and *in vivo*.

Well-controlled **clinical trials** on **head and neck cancer patients** using differing doses of **sulforaphane precursors** to assess real-world efficacy are lacking.



Sulforaphane Impedes Thyroid Cancer

Thyroid cancer incidence has rapidly increased in recent years³⁷ and is now estimated to be the seventh most common cancer in women.³⁸

A scientific group investigated the therapeutic potential of **sulforaphane** against **thyroid cancer** cells and explored the mechanisms underlying its anti-tumor effects.³⁹

The researchers showed that **sulforaphane** significantly inhibited thyroid cancer **cell proliferation** in a dose- and time-dependent manner.

They identified specific anti-cancer **genes** and **signaling factors** that enable **sulforaphane** to inhibit invasiveness of **thyroid cancer** cells.

When thyroid cancer cells were grafted into mice, sulforaphane significantly inhibited **tumor growth**.

The authors state that theirs is the first study to demonstrate underlying mechanisms that make **sulforaphane** a potential adjuvant treatment against **thyroid cancers**. It was published in **2015** but has not yet made an impact on mainstream oncology practice.

Prostate and Tongue Cancers

Sulforaphane has been shown to induce cancer cell **apoptosis** (self-destruction), inhibit progression of benign lesions into **malignant tumors**, and interrupt **metastasis**.⁴⁰

Thirteen years ago, a preclinical study found that **sulforaphane** regulates **genes** that enable initiation and metastasis of **tongue cancer** (one of many types of human head and neck cancers).⁴⁰

The beneficial properties of sulforaphane include inhibiting **angiogenesis**, the formation of new blood vessels that feed rapidly dividing malignant cells.³⁹

This same study showed the sulforaphane induced these protective effects against a line of **prostate cancer** cells.⁴⁰

Head and neck cancers include those of the **tongue** and are increasing in incidence because of the **HPV virus**, especially in men.^{18,19}

This study demonstrated *in vitro* the effectiveness of **sulforaphane** as a preventive compound against tongue cancers and prostate cell angiogenesis.

More recent epidemiological studies on human populations show markedly reduced cancer incidence in those consuming fresh **vegetables**.²¹⁻²⁴



“Breast Cancer Prevention— Is there a Future for Sulforaphane and Its Analogs?”

The headline in this box is that of a **2020** published review of **human** studies indicating that vegetables rich in **sulforaphane** may reduce **breast cancer** risk.³⁴

This comprehensive report presents data on the beneficial impact of **sulforaphane** against *signaling* pathways that initiate and then fuel **breast cancer** cell propagation and **metastasis**.³⁴

A paper published in **2019** described how **sulforaphane** suppressed the growth of **triple-negative** breast cancer **stem cells** *in vitro* and *in vivo*.³⁵

Triple-negative breast cancers are deadly because they lack typical **receptors** (**estrogen** or **HER2**) that enable effective treatments to be administered.

Estrogen-modulating **drugs** are effective against **estrogen-receptor positive** tumors. Herceptin® is used to treat some **HER2 receptor** cancers.

A **2017** systematic review and meta-analysis found a combination of **sulforaphane** + **epigallocatechin gallate** (from green tea) restored **estrogen receptor** expression in a line of **triple-negative** breast cancer cells, which would enable estrogen-modulating treatment to be more effectively utilized.³⁶

Despite **John Hopkins** researchers discovering potent effects of **sulforaphane** against mammary tumors back in **1992**, breast cancer patients today are seldom advised to increase their intake of absorbable oral **sulforaphane precursors**.

Clinical trials using differing doses and delivery methods of **sulforaphane precursors** are urgently needed.

Challenge of Obtaining Absorbable Sulforaphane

Including lots of **fresh vegetables** in one's diet is of indisputable value.

Mature **cruciferous vegetables**, however, contain relatively little **sulforaphane**.

What they provide are varying levels of a **sulforaphane precursor** called **glucoraphanin**, which converts to **sulforaphane** in the gut primarily as a result of the activity of the enzyme **myrosinase**.

Healthy intestinal enzymes/flora also help in the conversion to sulforaphane in the gut.

Mature broccoli and other cruciferous vegetables lack robust **sulforaphane-boosting** capacity.

Broccoli sprouts, on the other hand, contain **10 to 100 times more sulforaphane-**boosting potential.⁴²

Even so, cooking broccoli or sprouts destroys most of the **sulforaphane precursor (glucoraphanin)** and the

enzyme (myrosinase) needed to convert **glucoraphanin** (in the intestines) to **sulforaphane** for *absorption* into the bloodstream.

Swallowing pure **sulforaphane** is not a solution because it is unstable and mostly degraded in the stomach before reaching the **intestines for absorption**.

The **myrosinase** enzyme (found in cruciferous vegetables) is largely destroyed by stomach acid before it can convert **glucoraphanin** into **sulforaphane** in the small intestines.

Enteric coated **glucoraphanin + myrosinase** may be the ultimate solution to these issues.

The chart on the next page shows the pathway of how **glucoraphanin** (found abundantly in broccoli sprouts) converts to **sulforaphane**.

Broccoli sprouts contain abundant **glucoraphanin** that requires the **myrosinase enzyme** to convert to **sulforaphane**.

Why the Delay?

A comprehensive review of **clinical trials** investigating **broccoli sprouts** and other **sulforaphane precursors** was published in **2021**.⁴¹

It explains a lot about the ongoing delay in transitioning **sulforaphane precursors** into routine medical practice. Some highlights from this **2021** report include:

- **Pure sulforaphane** was considered a “**drug**” by the **FDA** and Institutional Review Boards that approve **human** research, as recently as the late 1990s or early 2000s. (This meant that stringent clinical trial **regulations** impeded human research.⁴¹)
- Most of the data regarding mechanisms of action and efficacy were derived from cell culture and animal studies performed with **pure sulforaphane**.
- Ascertaining an effective daily dose and dosing schedule requires arduous pilot human studies (adding more years of delay to assess efficacy).
- Other nutrients contained in cruciferous vegetables (flavonoids, anthocyanins, and carotenoids) might contribute to their anti-cancer properties (even though sulforaphane itself demonstrated remarkable anti-cancer effects in cell culture and animal studies).

- Huge variations exist in the concentration of **sulforaphane precursors** (glucoraphanin and myrosinase) in **broccoli sprouts** depending on species, temperature during growth, light, time to harvest, etc.
- Presence of food-borne pathogens and other potential contaminants was detected in **broccoli spouts**.
- Individual variability of human intestinal flora involved in sulforaphane enzymatic conversion.
- Lack of standardization of broccoli preparations.

Dietary supplements containing broccoli preparations should be standardized for **glucoraphanin** and include the enzyme **myrosinase** to deliver powerful **glucoraphane**, and be enteric coated to protect against stomach degradation.

This **2021** published review described many diseases beyond cancer for which **sulforaphane** might be efficacious.

It opened my eyes to the myriad of **bureaucratic obstacles** that have denied most of the public access to effective sulforaphane-boosting prevention and treatment strategies.

Eating raw **broccoli sprouts** is considered a good dietary way of boosting blood **sulforaphane** levels.

Some of the challenges of relying on raw **broccoli sprouts** include:

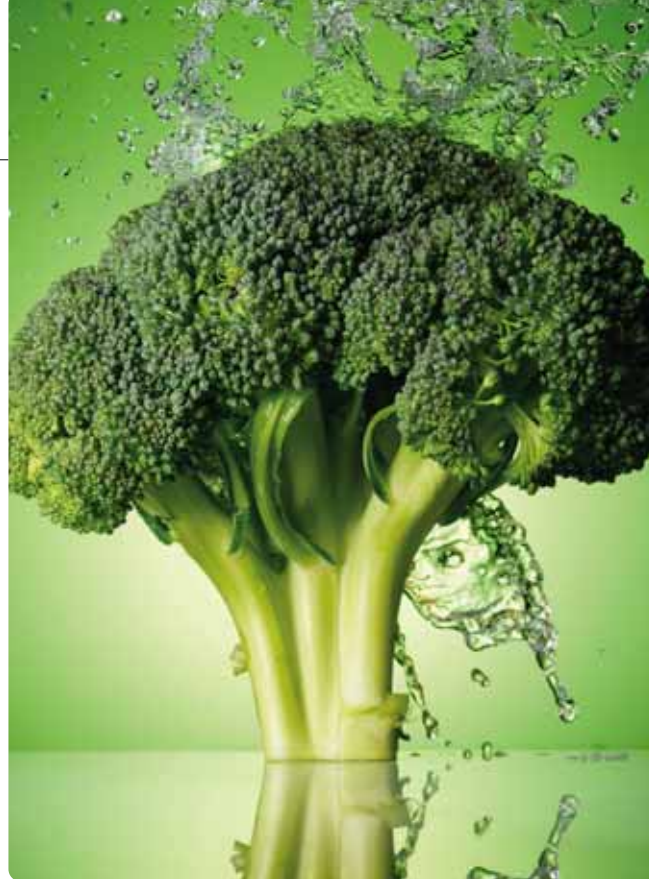
- High cost: About **\$244** a month to obtain decent amounts.
- Individual variability of gut enzymes: May limit sulforaphane bioavailability.
- Differing glucoraphanin/myrosinase levels: Even in broccoli sprouts.
- Inconvenience and taste issues of including broccoli sprouts in daily diet.
- Bacteria contamination of raw broccoli sprouts: Requires extensive cleansing beyond washing with warm water.
- High levels of stomach acid can neutralize myrosinase, thus impeding conversion of glucoraphanin to sulforaphane.



GLUCORAPHANIN

CONVERTED BY MYROSINASE

**Cancer-Fighting
SULFORAPHANE**



In this month's issue...

The article on **page 60** updates readers on a **dual-layered** caplet that contains **glucoraphanin + myrosinase** coated to avoid stomach acid.

This enables **sulforaphane** to be created in the **small intestine**, from the reaction of myrosinase and glucoraphanin, and then absorbed into one's bloodstream.

For me personally, I try to eat **broccoli sprouts**, but dislike the taste and need for intensive decontamination as bacteria tightly adhere to the surface texture of sprouts.

I include mature **cruciferous vegetables** in my diet and take a daily standardized **glucoraphanin + myrosinase** enterically coated tablet.

For those seeking to ingest more healthy foods, the article on **page 28** describes a **plant-based** multivitamin that provides the active nutrients found in **three servings of vegetables** and **two servings of fruit**. It's an efficient way to boost one's daily intake of these health-promoting foods.

For longer life,

William Faloon, Co-Founder
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References

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



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In the News



Increase in Erectile Function with Vitamin D and ED Drug

A study reported in *Urologia Internationalis* revealed an increase in erectile function and desire in men who took a vitamin D supplement together with the erectile dysfunction (ED) drug tadalafil, compared to those taking tadalafil alone.*

The retrospective investigation included 111 men with ED and deficient vitamin D levels. Fifty-three men received **5 mg** of tadalafil plus **4,000 IU** of **vitamin D3** per day, and 58 men received **5 mg** of tadalafil alone.

After three months, vitamin D levels and **erectile function** and **sexual desire** scores were *higher* among men who received vitamin D supplements in addition to the drug, compared to those who received only tadalafil.

Editor's Note: "We found that adding vitamin D to **5 mg** oral daily tadalafil treatment may have an additional positive effect on erectile function and sexual desire in ED patients with VDD [vitamin D deficiency]," the authors concluded.

* *Urol Int.* 2021;105(5-6):514-519.

Nutrients Help Protect Against HPV

Dietary antioxidants can help protect women against infection with high-risk strains of human papillomavirus (HPV), a leading cause of cervical cancer, the *Journal of Infectious Diseases* reported.*

The study included 11,070 women who had participated in the 2003-2016 National Health and Nutrition Examination Survey.

Higher serum levels of **albumin** and vitamins A, B2, E, and folate were associated with a *reduced* chance of having high-risk HPV.

Women who scored among the lowest **25%** on a nutritional antioxidant rating scale had a **30%** greater chance of infection with high-risk HPV and a **40%** greater chance of low-risk HPV than women whose scores were among the top **25%**.

Editor's Note: "Our findings provide valuable insights into understanding antioxidants' impact on HPV carcinogenesis," the authors concluded.

* *J Infect Dis.* 2021 Mar 18.





Vegetable Compound Shows Promise Against Diabetic Kidney Disease

A compound that occurs in watercress and other vegetables, phenethyl isothiocyanate (PEITC), has shown a potential benefit against diabetic nephropathy, according to research on rodents presented at the American Association for Anatomy annual meeting, held during Experimental Biology 2021.*

Diabetic nephropathy is a chronic kidney disease that develops in approximately one fourth of people with diabetes.

The researchers evaluated the effects of PEITC in a rat model of diabetic nephropathy. The compound was associated with **improved** kidney function, inflammation, and protein glycation.

Higher doses were associated with greater results. Kidney structure was also better preserved in association with PEITC.

Editor's Note: PEITC is naturally present in many dietary sources, including watercress, broccoli, turnips, and radish.

* American Association for Anatomy Annual Meeting. 2021 Apr 29.

Garlic Supplementation Improves Metabolic Syndrome

A randomized, clinical trial reported in *Phytotherapy Research* found an association between supplementation with garlic and improvement in several components of metabolic syndrome—a cluster of factors that increase the risk of developing diabetes and/or cardiovascular disease.*

The trial included 90 men and women with metabolic syndrome who received tablets containing **1,600 mg** of garlic powder daily for three months, or a placebo.

In the garlic-supplemented group, levels of beneficial **HDL** cholesterol were significantly *higher* than at the beginning of the study, and they were also higher compared to the placebo group.

Systolic and diastolic blood pressure, triglyceride levels, waist circumference, insulin and insulin resistance, fatty liver index, and appetite were reduced, compared to the placebo group.

Editor's Note: Metabolic syndrome is defined as the presence of three of the following five disorders: abdominal obesity, high blood pressure, high triglycerides, elevated blood sugar, and low levels of high-density lipoprotein (HDL) cholesterol.

* *Phytother Res.* 2021 May 11.





Omega-3s Can Reduce Some Cancer Risk

Fish intake and other dietary sources of omega-3 fatty acids have been associated with lower risk of some cancers, according to a study published in the *European Journal of Cancer Prevention*.*

Researchers looked at a group from North Carolina heavily adjusted for head and neck cancer risk factors.

They found that higher intake of fish and shellfish was associated with a non-statistically significant **20% decrease** in head and neck cancers, compared to lower intake.

Editor's Note: The authors commented that higher vegetable and fruit intake had already been shown to reduce head and neck cancers incidence, but more research is needed to corroborate the protective role conferred by **omega-3** ingestion.

* *Eur J Cancer Prev.* 2019 Mar;28(2):102-108.

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References

1. *Am J Clin Nutr.* 1987;45:1305-12.
2. *Clinica Chimica Acta.* 2000;294:1-26.

Caution: If taken in high doses, magnesium may have a laxative effect. If this occurs, divide dosing, reduce intake, or discontinue product.



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PLANT-BASED MULTIVITAMINS WITH **PHYTONUTRIENTS**

BY MICHAEL DOWNEY





Plant-based compounds called **phytonutrients** promote healthy longevity and help reduce the risk for many age-related disorders.

An astonishing **90%** of American adults fail to meet the daily recommended intake of **fruits** and **vegetables** rich in these plant nutrients.¹

Research suggests that, worldwide, low consumption of **vegetables** results in about **800,000** deaths from **heart disease** and **200,000** deaths from **stroke** annually.

Low intake of **fruit** appears to cause about **half a million** deaths from heart disease every year and over **one million** stroke deaths.²

Studies indicate that even a modest increase in consumption of these plant foods could help prevent **type II diabetes**.³

We know it is important to regularly consume a wide **variety** of fruits and vegetables for optimal health. But that can be challenging.

Researchers have identified a dozen fruits and vegetables that, together, provide a rich array of highly beneficial **phytonutrients**.

Extracts and powders of these 12 foods deliver the phytonutrient equivalent of **three servings** of vegetables and two servings of fruit.

As an added benefit, these **plant concentrates** also provide food-based vitamins and minerals.

The Importance of Phytonutrients

Phytonutrients are health-promoting **plant-based** compounds.

They have a wide range of benefits, including anti-inflammatory activity, immune support, DNA repair, carcinogen detoxification, and reduction in damage from toxin exposures.⁴

These mechanisms function at the cellular level to arrest processes that can lead to **diabetes, cancer, heart disease** and other disorders.

Increased consumption of **fruits** and **vegetables** is associated with *lower* rates of various risk factors for chronic disease.⁵

The World Health Organization recommended an adequate intake of **fruits** and **vegetables** for the prevention of chronic diseases including **obesity**.⁶

For example, a **diet** rich in **vegetables** and **fruits** may:⁷

- Reduce the risk of heart disease and stroke,
- Help prevent some cancers, such as breast and lung cancer,
- Support eye health and help prevent macular degeneration and cataracts,
- Lower risk of digestive problems,
- Improve blood sugar levels and help prevent type II diabetes, and
- Help keep appetite in check.

But only **10%** of American adults get the recommended daily intake of phytonutrient-rich fruits and vegetables.¹

Even those who *do* may not realize that today's industrial farming practices may deplete the soil of critical nutrients.

Some studies have shown that the **vitamin** and **mineral** content of fruits and vegetables has significantly declined since 1950.⁸

Some of today's **multi-nutrient** formulas provide concentrated plant-derived **phytonutrients**. This helps those who want to boost their daily intake of beneficial plant compounds.

Best Documented Phytonutrients

In general, all fruits and vegetables contain *some* **phytonutrients**. But a wealth of research has allowed scientists to identify some of the **most documented** plant sources of health-promoting nutrients.

QUINOA SPROUTS

Quinoa, a flowering plant from South America, may improve gut bacterial imbalance, body composition, celiac disease, lactose intolerance, and inflammatory bowel disorders.⁹ It shows strong antioxidant effects,¹⁰ and animal studies suggest quinoa might help prevent diabetes, obesity and dyslipidemias.¹¹





WHAT YOU NEED TO KNOW

Phytonutrients

- **Phytonutrients** are beneficial chemicals produced by plants. They are often called phytochemicals.
- Plants use different phytonutrients to protect themselves from different sources of harm. Some protect against insects, for example, while others protect against radiation from the sun.
- Phytonutrients are abundant in fruits, vegetables, legumes, nuts, tea, whole grains, and many spices.
- Many phytonutrients, such as **flavonoids** and **proanthocyanidins**, give brightly colored fruits and vegetables their pigments. Other phytonutrient-rich foods, including onions and garlic, have little color. It's important to include a full range of plant foods in your diet.
- Different phytonutrients provide a wide range of benefits in people, including antioxidant and anti-inflammatory activities, enhanced immunity, improved intercellular communication, DNA repair, reduced damage from exposure to toxins and carcinogens, and potentially a reduced risk of **cancer and heart disease**.⁴

AMLA

Amla is a small berry grown in India that has become known for its “superfruit” benefits. A scientific review of preclinical studies found that amla functions as a free radical scavenger, anti-inflammatory, antimutagenic, and immune enhancer.¹² These properties are efficacious in the prevention of certain cancers. Other clinical research showed that amla extract lowered levels of after-meal glucose, cholesterol, and triglycerides in both diabetics and nondiabetics.¹³ A review found evidence that amla and its extracts may be of value as part of a way to delay Alzheimer’s progression.¹⁴

ONION

Onion may help prevent obesity and improve liver function.¹⁵ Its compounds have been shown to have anticarcinogenic, antithrombotic, anti-asthmatic, and antimicrobial activity.¹⁶ Onions may affect many biologic processes that reduce cancer risk,¹⁷ and they may help to prevent cardiovascular disease.¹⁸

GRAPSEED

Grapeseed has been shown to have anti-hypertensive effects. One review of 16 clinical trials found that grapeseed extract exerted significant improvements in blood pressure, especially among people with obesity and those with metabolic disorders.¹⁹



BROCCOLI

Studies show that compounds in broccoli may protect against the risk of cancer via several mechanisms.²⁰ This protective effect is so significant that scientists refer to broccoli as “green chemoprevention.”²¹ Research in animals suggests that broccoli may improve gut microbiota and attenuate colitis.²² In mice fed a typical Western diet, broccoli appears to inhibit the development of nonalcoholic fatty liver disease (NAFLD) and liver cancer.²³

PALM FRUIT

Palm fruit is rich in polyphenols and provides strong antioxidant activity.²⁴ Animal research indicates that palm fruit phenolics may inhibit glucose absorption, reduce insulin resistance, and enhance insulin secretion, suggesting that it may help prevent or improve diabetes.²⁵ A rat model suggested palm fruit supports large-intestine health.²⁶

ELDER FRUIT

Cell research found that elder fruit inhibits *infectious bronchitis* virus at an early point in the replication process “probably by rendering the virus non-infectious.”²⁷ A mouse model showed that it stimulated an immune response that prevented viral (flu) infection.²⁸ European black elderberries were found to have antibacterial, antiviral, antidepressant, antitumor, and hypoglycemic properties, as well as the ability to decrease body fat.²⁹ A review of five clinical studies found that elder fruit preparations taken within 48 hours of symptom onset may reduce the duration and severity of common cold and influenza symptoms in adults.³⁰

BLACKBERRY

Blackberry has been used extensively in herbal medicine.³¹ It provides diverse pharmacological effects that are antioxidant, anticarcinogenic, anti-inflammatory, antimicrobial, anti-diabetic, anti-diarrheal, and antiviral.³² Remarkably, one study found that, by protecting against oxidation and inflammation-induced injury, blackberry extracts prevented liver damage in rats and may alleviate non-alcoholic fatty liver disease (NAFLD).³³

SWEET CHERRY

After studying the phytonutrients in sweet cherry extracts, scientists have documented their suppression of key events in the carcinogenic process. This may be related to their effects against oxidative stress, chronic inflammation, deregulated cell proliferation and induction of beneficial apoptosis (programmed death of defective cells).³⁴ This review of laboratory studies suggested sweet cherries have potential for adjuvant cancer treatment.

Laboratory studies also indicate sweet cherries may help counteract neurodegenerative disease through their upregulation of BDNF (brain-derived neurotrophic factor), a protein that promotes the survival of neurons.³⁵

CRANBERRY

Cranberry extracts were shown in a preclinical study to suppress the growth of dangerous *E. coli* bacteria, while promoting beneficial bacteria.³⁶ These berries have well-documented beneficial effects against urinary tract infections (UTIs), the second most common type of infections worldwide.³⁷ Overall, cranberry phytonutrients display properties that are antibacterial, cardioprotective, and anti-cancer.³⁸





DRIED PLUM

PLUM

Growing evidence suggests that dried plum has the potential “for preventing bone loss in postmenopausal women, with the potential for long-lasting bone-protective effects.”³⁹ In a cell study, a plum flavonoid was shown to inhibit the early entry stage of the hepatitis C virus lifecycle, possibly by acting directly on the virus.⁴⁰ Animal studies suggest plum extracts boost memory and learning⁴¹ and may inhibit the onset of epileptic seizures in rats.⁴²

PERSIMMON

Persimmon compounds have antioxidant and anti-inflammatory properties and some evidence suggests that they may inhibit formation of skin wrinkles.⁴³ Persimmon phytonutrients are known to mitigate oxidative damage and may regulate blood lipids and lower blood sugar—pointing to a protective effect against cardiovascular disorders and diabetes.⁴⁴

PLANT-EXTRACT SUMMARY

Twelve healthy plant foods have been described so far.

Adding these to one’s daily diet makes a lot of scientific sense.

Another option is to ingest these fruits/vegetables in the form of extracts and powders that provide the same amount of:

- **Flavonoids** found in **three servings of vegetables**, and
- **Proanthocyanidins** found in **two servings of fruit**.

Flavonoids are a very large and diverse group of beneficial plant pigments.

Proanthocyanidins are a flavonoid subgroup.

These compounds help your body fight off damaging free radicals, reduce harmful inflammation, regulate cellular activity, support the immune system, and protect against dangerous stressors and toxins.⁴

New Human Study Shows Flavonoids Protect Brain Health

Ingestion of colorful fruits and vegetables containing **flavonoids** reduced the risk of **cognitive decline** in a **human** study published in **July 2021**.⁶⁵

The study, published in the journal *Neurology*, showed that the intake of **flavonoid-rich foods** plays an important role in maintaining **brain health**.

A large cohort of people were followed for more than **20 years**, with dietary questionnaires administered every four years, and subjective **cognitive function** assessed twice.

Among the *highest* **20%** of flavonoid eaters there was a **20% lower** risk of decline in thinking skills in people who consumed about **600 mg** of flavonoids daily, compared to those in the *lowest* **20%** who ate only about **150 mg** a-day.

The researchers noted several beneficial properties of **flavonoids** that help protect the brain’s blood supply, which may slow the cognitive decline that can lead to dementia.

Individuals’ **dietary habits** are related to their **brain health** in later life, the study confirmed.





SUNFLOWER SEEDS

Food-Derived Vitamins

Phytonutrients aren't the only beneficial ingredients found in fruits and vegetables. The following **vitamins** can also be extracted directly from food sources:

CAROTENOIDS

The body can make its own **vitamin A** from **carotenoids**, but carotenoids have more diverse effects beyond ensuring adequate vitamin A status.

Three carotenoids—**alpha-carotene**, **beta-carotene**, and **gamma-carotene**—can be derived from sustainably sourced Malaysian **palm fruit**. They are delicately extracted using a low-temperature process called *molecular distillation*.

Vitamin A and its carotenoid precursors help support vision, cellular differentiation and proliferation, immune system integrity, thyroid hormone formation, and healthy lung, kidney, skin, and mucous membranes. It also contributes to the growth of bone, teeth, and soft tissue.⁴⁵⁻⁴⁷

VITAMIN C

A source of **vitamin C** is **amla fruit**, also known as **Indian gooseberry**.

Vitamin C is associated with immune-system health. It protects against oxidative stress and stimulates the production and function of white blood cells.^{48,49} Vitamin C is also vital to the formation of **collagen**, the critical structural protein in arterial walls, skin, bones, and teeth.⁴⁹

VITAMIN D

Vitamin D3 is mostly found in animal sources. As a result, many *vegan-friendly* vitamin D formulas contain vitamin D2, which is inferior to **D3** for maintaining blood levels.⁵⁰

However, **vitamin D3** can also be isolated from non-GMO, organically farmed **algae**, allowing vegans to use the superior D3 form.

Vitamin D is best known for its support of strong bones. It also promotes healthy cell division and immune function^{51,52} and plays a key role in lung, brain, cardiovascular, and nervous system health.⁵³

VITAMIN E

Sunflowers are an abundant source of **vitamin E**.

Vitamin E can help boost immune function, inhibit inflammation, reduce oxidative stress, and promote healthy brain, vision, blood, and skin.⁵⁴⁻⁵⁶

B VITAMINS

Some **B vitamins** can be derived from organic **quinoa sprouts**. The quinoa is placed in a nutrient-rich solution so that during germination, the sprouts concentrate the nutrients into their cells and convert them into **active** B-vitamin forms.

B vitamins are necessary for DNA/RNA synthesis and repair, proper immune function, neurotransmitter synthesis, and healthy **DNA methylation** (a process that keeps gene expression working properly).⁵⁷

Adults with **low** B-vitamin status are at increased risk for developing age-related disorders, particularly cognitive and cardiovascular diseases.⁵⁷



INDIAN GOOSEBERRY



MINERALS

The minerals iodine, magnesium, zinc, selenium, manganese, chromium, and molybdenum should be included in any plant-based formula.

These minerals are needed for healthy metabolism, thyroid function, wound healing, bone strength, immune responses, enzymatic reactions throughout the body, and much more.⁵⁸⁻⁶⁴

It is vital to get sufficient intake of minerals, along with vitamins and phytonutrients, on a regular basis.

Summary

Phytonutrients are plant compounds that promote healthy **longevity** and help protect against chronic diseases and premature aging.

Scientists have found that by combining together the extracts and powders of **12** key foods, it is possible to get the phytonutrient equivalent of **three servings of vegetables** and **two servings of fruit**.

An optimal **food-based** multivitamin may also provide key **vitamins** and **minerals** naturally found in fruits and vegetables. ●

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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MELATONIN'S BRAIN-PROTECTING PROPERTIES

PAZ ETCHEVERRY, MS, PHD



Melatonin has been shown to help fight cancer, boost immune function, and enable better sleep in some people.¹⁻³

This **pineal hormone** is secreted abundantly in youth but declines with normal aging.

Research shows that **melatonin** improves several aspects of **memory** and increases formation of new brain cells.⁴⁻⁹

Patients with Alzheimer's have *lower* melatonin levels than healthy individuals of the same age. Increasing melatonin levels may help protect against worsening of **Alzheimer's** and **Parkinson's**.^{3,10}

Melatonin can be part of a **nightly** regimen to help protect the aging brain.



What Is Melatonin?

Melatonin is a hormone produced in the **pineal gland**, which is located in the brain. This hormone is derived from the amino acid **tryptophan**.^{3,11}

Often called the “**sleep hormone**,” melatonin is central to regulating the body’s sleep-wake cycle.^{1,2} It has long been used to treat various sleep disorders, including jet lag and insomnia, and to improve overall quality of sleep.¹

Melatonin was first discovered in 1958. But it wasn’t until 1993 that researchers found that it is also a powerful **antioxidant** that quenches free radicals.^{3,11}

In addition, melatonin inhibits the growth of certain **cancers** and enhances the **immune system**.^{1,2,12-14} This has led some researchers to conclude that melatonin may be a useful adjunct intervention against **viral** infections, including the flu.¹⁵

Melatonin reduces cell death and has shown **neuro-protective** effects.¹⁶ This has implications for circumventing memory loss and neurodegenerative disorders.

Melatonin and Memory

As we age, our ability to store and recall **memories** often fades.

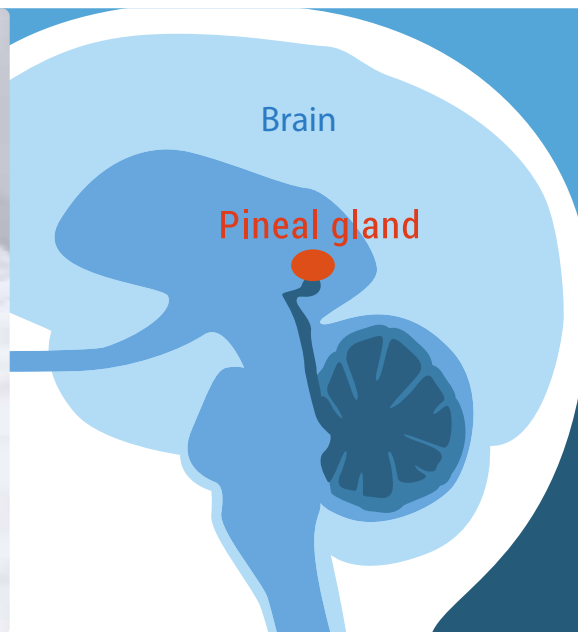
This decline in memory begins during middle age and gradually worsens. About **40%** of the elderly population experiences age-related memory issues.¹⁷

Studies in animals and humans show that **melatonin improves memory**.

In one study, healthy men receiving a one-time, **3 mg** dose of melatonin were able, shortly thereafter, to recall *more* objects from a list they were asked to memorize than participants who were given a placebo.⁵

There are several ways in which **melatonin** works to improve memory:

- Melatonin reduces **oxidative damage**, which has been shown to lead to memory deficits in animals and humans.^{18,19}
- In cultured neurons, it improves **neural plasticity**,⁷ the ability of the brain to change and adapt to experience.^{19,20}
- Melatonin may protect against **chronic mild stress**. The hormones that are produced during stress (epinephrine, norepinephrine, and cortisol) negatively affect the retrieval of memories.^{5,21,22}
- It may increase levels of **brain-derived neurotrophic factor** (BDNF).⁴ BDNF is a protein found in our central nervous system, particularly the **hippocampus** (the brain’s memory center), that *increases* neuron formation (BDNF levels tend to be lower in patients with neurological diseases).^{8,9}
- Melatonin improves **sleep**, which is important for healthy brain function and memory retrieval.^{5,10}





WHAT YOU NEED TO KNOW

Melatonin's Neuro-protective Benefits

- **Melatonin** is a hormone that has long been used to improve sleep.
- Its **antioxidant** and **anti-inflammatory** activities contribute to numerous other benefits, including in the brain.
- Human studies show that melatonin improves **memory** in healthy adults.
- It also shows promise as an adjuvant intervention against neurodegenerative diseases such as **Alzheimer's** and **Parkinson's** diseases.

In addition, melatonin diminishes the negative effects that certain **drugs** and **toxins** have on our memory.

For example, one side effect of the cancer chemotherapy drug **fluorouracil** is that it impairs memory by reducing cell growth in the hippocampus.

In a study on rats, melatonin given before, during, or after administration of fluorouracil decreased the effects of the drug on memory loss by enhancing cell division in the hippocampus.¹⁹

Similar findings have been reported when melatonin was used with other memory-impairing substances, including **methamphetamine**,⁴ the household insecticide **propoxur**,²³ and **scopolamine**, a drug used to reduce or prevent nausea.²⁴



Effects on Alzheimer's Disease

Approximately **44 million** people in the world have **Alzheimer's disease**. That figure is expected to reach close to **135 million** by 2050.¹⁰

Patients with Alzheimer's have lower melatonin levels than healthy individuals of the same age. This has led some researchers to conclude that **melatonin deficiency** could play a role in the development of Alzheimer's disease and that melatonin may be an ideal therapeutic agent.^{3,11}

Melatonin has **anti-inflammatory** and **antioxidant** properties that protect the brain against increased oxidative damage.¹¹

About **45%** of Alzheimer's patients have difficulties with **sleep**, and lack of sleep has been associated with an *increased* accumulation of **beta-amyloid**.¹⁰ Human studies suggest that melatonin intake not only improves sleep quality in those with Alzheimer's but also **slows the progression** of cognitive problems.^{10,25-27}

Research also indicates that melatonin can improve **brain plasticity** and promote **neuron formation** in the hippocampus, which may help slow the degeneration caused by Alzheimer's.²⁵

Promise for Parkinson's

Parkinson's disease is a neurodegenerative disorder characterized by speech difficulties, tremors, decrease in dexterity, cognitive problems, and sleep disorders.¹⁴

According to the United Nations, the number of people with Parkinson's is expected to reach **two billion** worldwide in 2050.³

This disease results from a defect in the production of **dopamine**,³ a neurotransmitter produced in the brain that plays important roles in movement, learning, memory, and mood.²⁸

Studies have shown that **melatonin prevents** a reduction in dopamine. It also prevents the loss of the neurons that produce dopamine.³

Melatonin provides additional protective effects in Parkinson's due to its anti-inflammatory and antioxidant activity.^{29,30}

When **melatonin** is given to patients with Parkinson's disease, it leads to reductions in neuronal death, oxidative stress, and inflammation. Melatonin also **improves cognitive performance** and sleep disorders in Parkinson's patients.¹⁴

Researchers are increasingly focused on melatonin as a safe, effective tool to help protect the brain and possibly improve clinical outcomes in Alzheimer's and Parkinson's patients.^{31,32}

Summary

Melatonin is well-known for improving sleep in some people.

Numerous studies show that it can also improve **memory** and may be a potential adjuvant intervention for neurological disorders including **Alzheimer's** and **Parkinson's** diseases.

It can be part of a nightly regimen to help protect the aging brain.

Typical melatonin dosages range from **300 mcg** to over **10,000 mcg (10 mg)** and can be purchased over-the-counter in capsules, sublingual tablets, or liquid.

Melatonin is also available in immediate- and extended-release forms, usually at very low cost. •

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

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VITAMIN D REDUCES BREAST CANCER RISK

BY PAZ ETCHEVERRY, MS, PHD



A meta-analysis published in **2021** found that low **vitamin D** levels are prevalent among newly diagnosed **breast cancer** patients.¹

The authors noted that vitamin D insufficiency/deficiency may be linked with **breast cancer** initiation or progression.

One reason is that vitamin D regulates **genes** in cancer cells, **inhibiting** their growth and disabling their ability to **survive**.^{1,2}

For women *already* suffering from breast cancer, vitamin D may improve survival, reduce recurrence, and reduce all-cause mortality.³⁻⁵

An analysis published in the ***British Journal of Cancer*** found that the **risk of death** from breast cancer was **42% lower** in women with **high** vitamin D levels, compared to those with low levels.⁶

The medical community is increasingly recognizing that vitamin D can help protect against breast and other cancers.

Risks of Low Vitamin D

Low levels of vitamin D are associated with many different problems, including brittle bones, increased cardiovascular disorders, and cognitive decline.⁷⁻¹⁰

Studies around the globe have associated a link between low vitamin D levels and increased risks of different types of **cancer**, including colon, ovarian, prostate, and breast cancers.

In Pakistan, for example, **metastatic breast cancer** was more prevalent in women with **vitamin D deficiency** than in those with slightly better vitamin D status.¹¹

In a mainly Hispanic population, a high prevalence of vitamin D **insufficiency** (less than **30 ng/mL**) and **deficiency** (less than **20 ng/mL**) was found among breast cancer patients.¹²

Similar findings have been reported in women from other countries, including Brazil,¹³ Sudan,¹⁴ and China.¹⁵

How Vitamin D Protects Against Cancer

There is evidence that **vitamin D** helps protect against **breast cancer** in three different ways.

1. Vitamin D regulates genes in cancer cells.

The active form of vitamin D exerts its effects in the body by first binding to **vitamin D receptors** on the nucleus of cells. These receptors are also present in **tumor cells**.

Once it binds to these receptors, vitamin D regulates several dozen genes and pathways that **inhibit the growth** and lead to apoptosis (programmed death) of cancer cells.^{1,2}

2. Vitamin D quenches inflammation by inhibiting the synthesis of inflammatory compounds.¹⁶

For example, vitamin D reduces the formation of pro-inflammatory **prostaglandins** that are associated with breast cancer development. It does this by *decreasing* their production and *enhancing* their degradation.⁵

Vitamin D also *decreases* levels of **nuclear factor-kappa B (NF-kB)** and **tumor necrosis alpha (TNF)**, which have been linked to breast cancer formation and growth.¹⁷⁻²⁰

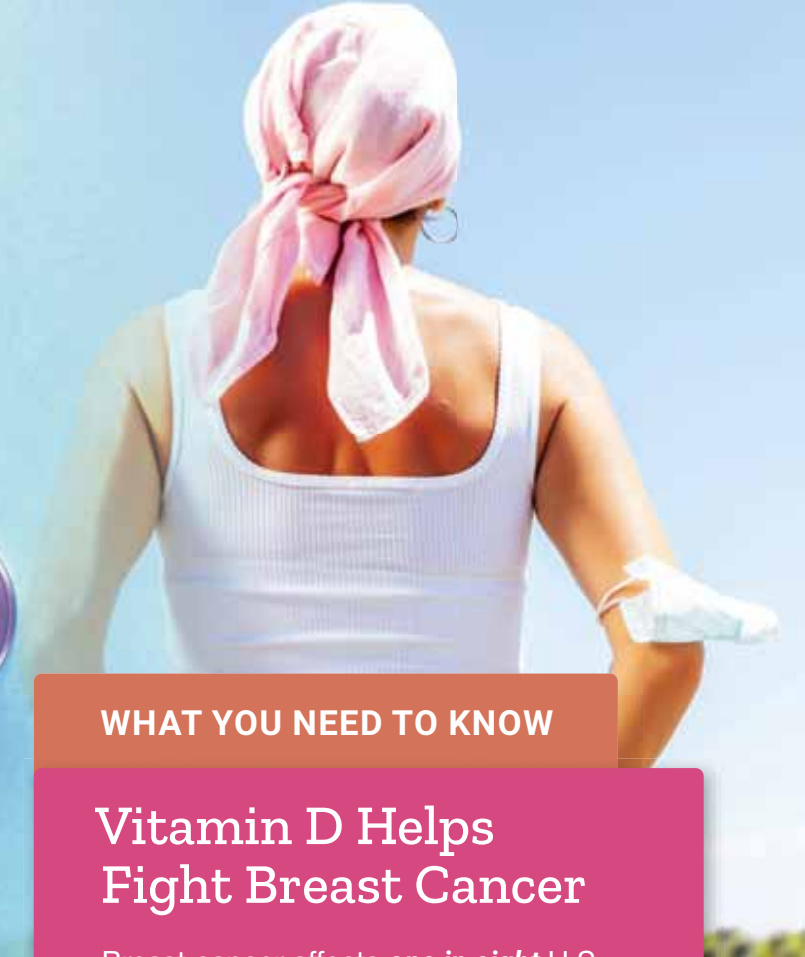
3. Vitamin D supports immune function.

Vitamin D receptors are distributed throughout many tissues and organs, including the immune system (thymus, B and T lymphocytes, and bone marrow).²¹

The activity of various defense and immune cells, including antigen-presenting cells, macrophages, monocytes, and activated CD4 T cells is modulated by vitamin D.²¹

Experimental studies have demonstrated that the active forms of vitamin D (calcitriol) and its analogs can inhibit proliferation and induce apoptosis in various cancer cell types.²²





Fighting Existing Breast Cancer

Vitamin D can also help patients who *already* have breast cancer.²³⁻²⁶

In a study that followed a group of women previously treated for **breast cancer**, those with the *highest* blood levels of vitamin D were **28% less** likely to have died during the eight-year follow-up period than women with the lowest levels.²⁶

A meta-analysis found that, in women whose 25-hydroxyvitamin D levels were **9.3 ng/mL** or higher, every **4 ng/mL** increase in vitamin D level decreased the risk of breast cancer death by **6%**.²⁵

Aromatase inhibitor drugs like letrozole or anastrozole are commonly used in breast cancer treatment. These medications may cause side effects in bones or muscles. These symptoms are worse for women with low vitamin D levels, and supplementation may help mitigate these.²⁷⁻²⁹

Summary

Low blood levels of **vitamin D** are associated with *increased* rates of **breast cancer**.

Vitamin D may exert its protective effects by regulating genes in cancer cells, quenching inflammation, and suppressing the levels and activity of estrogen.

WHAT YOU NEED TO KNOW

Vitamin D Helps Fight Breast Cancer

- Breast cancer affects **one in eight** U.S. women in their lifetimes.³⁰
- **Vitamin D** has been shown to have protective effects against breast cancer.
- In women who already have breast cancer, vitamin D **increases survival rates**, and can reduce the painful side effects of certain breast cancer treatment drugs.

In women who have already been diagnosed with this disease, vitamin D intake **increases survival rates**, and has been found to reduce pain associated with aromatase inhibitor treatment.

Life Extension[®] recommends that readers consider daily doses in the range of **3,000 IU** to **8,000 IU** for overall health.

Blood tests for **25-hydroxyvitamin D** enable precise individual dosing of vitamin D supplements. •

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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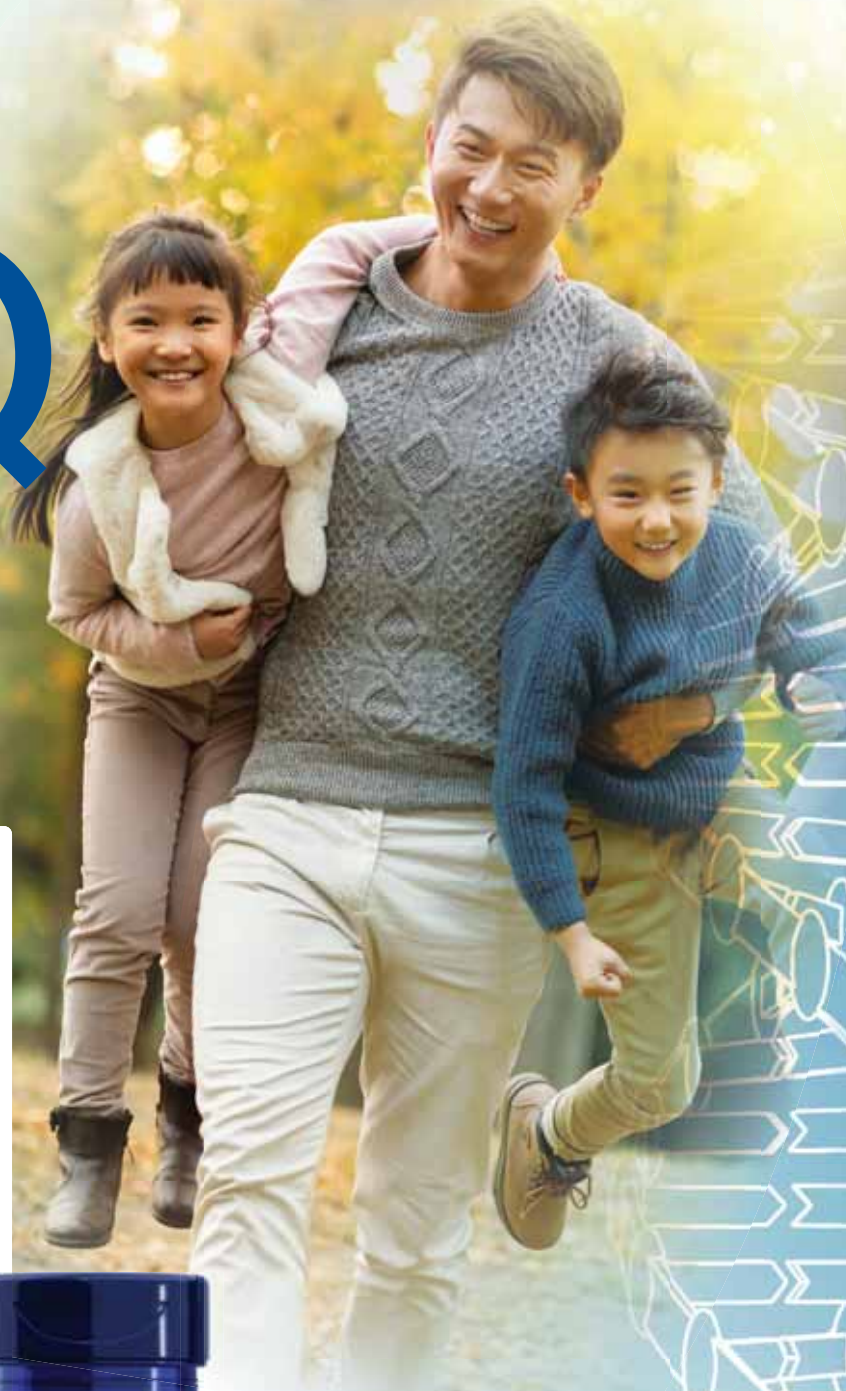
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HOW TO OBTAIN BROCCOLI'S BENEFICIAL COMPOUNDS

BY MICHAEL DOWNEY



Up to **90%** of all **cancers** are caused by environmental and lifestyle factors.^{1,2}

Research shows that a *higher* intake of **broccoli** and other **cruciferous vegetables** is associated with a *reduced* risk of cancer.^{3,4}

But until recently, optimizing intake of a beneficial **cruciferous vegetable** compound called **sulforaphane** has been challenging.

A novel delivery system keeps the **sulforaphane precursor** (glucoraphanin) apart from the **myrosinase** enzyme until they reach the small intestine.

Once in the small intestine, **myrosinase** converts **glucoraphanin** into **sulforaphane** for *absorption* into the bloodstream.

Cruciferous Nutrients Inhibit Cancer

Cruciferous vegetables include broccoli, kale, cabbage, cauliflower, watercress, and Brussels sprouts.

Studies going back decades have shown that large dietary intake of these foods is associated with a *reduced* risk of developing different forms of **cancer**, including many of the most common types, like **lung** and **colorectal cancer**.⁴⁻⁶

That's because **cruciferous** vegetables are loaded with compounds that shield cells from processes that can transform them into malignant tumors.^{3,4}

Two of the most protective compounds are:⁷⁻⁹

- **Sulforaphane** and
- **3,3'-diindolylmethane (DIM)**.

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

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

Nature has found a way around this problem.

How Plants Produce Sulforaphane

Sulforaphane is a cancer-fighting compound we get from cruciferous vegetables. And yet it isn't present in them.

Instead, a *precursor* called **glucoraphanin** is stored inside the cells of these plants. In a separate compartment in these cells is an *enzyme* called **myrosinase**.

When mixed together, the **myrosinase** *converts* the **glucoraphanin** into **sulforaphane**.

This is what happens when the vegetable is eaten **raw**. During digestion, sulforaphane is formed. It can then be absorbed within the small intestine before it degrades.^{4,5,9}

But maximizing these anti-cancer benefits would require the consumption of massive amounts of raw broccoli.

The challenge for scientists was to find a way to deliver **glucoraphanin** and **myrosinase** *separately* to the small intestine.

Mimicking Nature

One group of scientists came up with an ingenious solution that copies nature.

They isolated **glucoraphanin** and **myrosinase** from broccoli, then developed a delivery system that keeps them separate, *just the way plants do*.

A dual-layered tablet was given an **enteric coating** to prevent its ingredients from being released until it reaches the small intestine.

With this unique delivery system, the compound **glucoraphanin** and the enzyme **myrosinase** meet and mix *in the small intestine*. There, they come together to create **sulforaphane**, just as nature planned.

The results have been striking. Research at the Johns Hopkins University School of Medicine demonstrated that **sulforaphane** levels from this **glucoraphanin-myrosinase** mix are **three to four times** more bioavailable (absorbable) than those created by glucoraphanin supplementation alone.¹⁰



Sulforaphane Reduces Cancer Risk

Maximizing production of **sulforaphane** can have a huge impact on fighting cancer.

Lab and animal studies show sulforaphane:¹¹⁻¹³

- Kills cancer stem cells,
- Slows the growth of tumors, and
- Promotes the death of cancer cells.

In one study, rats were divided into two groups. One was given **sulforaphane** and the other was not. Both groups were then given a strong **carcinogen**.

The animals that had been given sulforaphane developed **fewer tumors** compared to controls. The tumors that did develop were smaller and grew more slowly.¹⁴

A large body of preclinical research has revealed great promise for **sulforaphane** as regards reducing the risk of many cancers, including those of the:

- Breast,¹¹⁻¹³
- Bladder,¹⁵
- Lung,¹⁶
- Prostate,¹⁷
- Cervix,¹⁸⁻²⁰
- Blood (leukemia),²¹⁻²³
- Mouth,²⁴ and
- Brain.^{25,26}

The Anti-Cancer Effects of DIM

The benefits of the cruciferous nutrient **DIM** have been evaluated in a study of women with a history of **breast cancer**.²⁷

In this study, women were randomized to receive either DIM (**108 mg** per day in one study) or a placebo.

DIM was found to significantly alter the mix of estrogen metabolites, increasing “good” estrogen metabolites, and reducing “bad” estrogen metabolites.

DIM has also been evaluated for prevention of **cervical cancer**.^{5,7,28}

In one remarkable study, women with a cervical precancer lesion—**cervical intraepithelial neoplasia**—were randomized to receive either **100 mg** of DIM, **200 mg** of DIM, or a placebo. After three to six months, 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.⁷



WHAT YOU NEED TO KNOW

Maximizing the Anti-Cancer Effects of Cruciferous Vegetables

- **Cruciferous vegetables**, such as broccoli, cabbage, cauliflower, Brussels sprouts, and kale, are associated with reduced risk of **cancer**.
- Two cruciferous compounds are especially well-validated for their cancer-fighting properties: **sulforaphane** and **3,3'-diindolylmethane (DIM)**.
- While DIM is stable, sulforaphane rapidly degrades if not absorbed quickly.
- Scientists have developed a way to separately package a sulforaphane **precursor** and an **enzyme** that converts it into sulforaphane. The sulforaphane is then created **in the small intestine**, where it's rapidly absorbed into the bloodstream.
- Early research shows that DIM and bioavailable sulforaphane can prevent changes that lead to cancer, stop tumors from developing and spreading, and even cause cancer cells to die off.

Four Ways Sulforaphane and DIM Fight Cancer

What's striking about **sulforaphane** and **DIM** is that they have demonstrated anticancer effects in virtually **every tissue studied**.

Equally impressive, these compounds can both *prevent* cancerous changes in cells, and in preclinical studies have been shown to **reverse** the progression of existing tumors.

These nutrients have been shown to reduce cancer risk in four main ways:

1. Preventing Harmful Changes to Gene Expression

Cancer can be caused by **epigenetic** changes, which can turn protective genes “off” and flip “on” genes that enable uncontrolled cellular proliferation. Adverse changes to **gene expression** can be triggered by behavior (like smoking) or exposure to environmental toxins.

Sulforaphane and **DIM** can reverse some of these cancer-associated changes.¹⁷

For example, sulforaphane reverses alterations of **histone proteins** involved in the regulation of genes that could otherwise contribute to cancer.^{29,30}

This gene regulation mechanism is a target of cancer drugs now under development.³¹⁻³³



2. Attacking Pre-Cancerous Cells and Blocking Tumor Development

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

Sulforaphane has the ability to *suppress* signals and enzymes that spur the growth of tumors. It can also *reduce* the formation of blood vessels that feed them.³⁴⁻³⁹

DIM also has been shown preclinically to block the formation of new blood vessels in tumors, starving them of oxygen and nutrients needed to grow.⁴⁰

Both **sulforaphane** and **DIM** also turn on genes associated with cancer cell **apoptosis** (programmed cell death). This causes the abnormal cells to die off, while leaving healthy cells unharmed.^{41,42}

It is believed that these effects could prevent **pre-cancerous** cells from developing into cancer and slow the growth of **existing** cancer.

3. Fighting Estrogen-Driven Cancer Growth

An estrogen metabolite called **16-alpha hydroxyestrone** can stimulate proliferation of breast and prostate cancers.⁴³⁻⁴⁵

DIM helps shift the estrogen balance *away* from **16-alpha hydroxyestrone** that promotes cancer and *toward* one (**2-hydroxyestrone**) that *inhibits* it.²⁷

In women who have had **breast cancer**, daily **DIM** intake shifts these estrogen metabolites toward a preponderance of the healthier form.²⁷

In men, *higher* estrogen levels are associated with prostate enlargement and cancers. Studies show DIM can prevent estrogen-induced stimulation of prostate cancer cells.^{46,47}

Sulforaphane reinforces this protection by fighting the potential DNA-damaging effects of estrogen, which could help to prevent the early DNA damage that leads to cancers.⁴⁸⁻⁵⁰

4. Blocking a Key Inflammatory ‘Switch’

Our bodies have a “switch” that activates inflammation, including **chronic inflammation** that contributes to cancer and other age-related diseases.

This switch is called **nuclear factor-kappa B (NF-kB)**. Preliminary research shows that **sulforaphane** *blocks* NF-kB, reducing the inflammation that contributes to cancer growth. It also kills **cancer stem cells** that can trigger tumor recurrence.^{12,51,52}

These mechanisms are likely reasons why **sulforaphane** and **DIM** are two of the most robust cancer-fighting compounds found in nature.

Summary

Raw **cruciferous vegetables** like broccoli are associated with a reduced risk for many types of **cancers**.

Many of these anti-cancer effects are due to two compounds derived from these vegetables: **sulforaphane** and **DIM**.

DIM is stable and easily absorbed when taken orally. But **sulforaphane** is not.

Scientists have solved this problem by creating a delivery system that *separates* a sulforaphane **precursor** and an **enzyme** that converts it to **sulforaphane**.

This enables **sulforaphane** to be formed in the small intestine where it can be rapidly absorbed, delivering *higher* blood levels of the beneficial 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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Sulforaphane May Help Prevent Alzheimer's Disease

Preclinical research suggests that sulforaphane may help prevent some of the pathogenic factors that lead to **Alzheimer's disease**.

A review published in the **March 2021** issue of *International Journal of Molecular Sciences* noted that sulforaphane, known for its **anti-inflammatory** effects, has recently been studied for its effects on **brain health**.⁵³

Dr. Jiyoung Kim, the scientist who conducted this study, pointed out that changes occur within the brain **10-15 years before the cognitive decline** that leads to a diagnosis of Alzheimer's.

For this reason, she focused on studies that investigated the effects of sulforaphane on **five different preclinical biomarkers** for Alzheimer's: beta amyloid, tau, inflammation, oxidative stress, and neurodegeneration.⁵³

- Most significantly, cell and animal studies demonstrated that sulforaphane can *prevent* the production of both **beta amyloid** and **tau**, proteins involved in Alzheimer's disease.
- Evidence also showed that sulforaphane *inhibits* the Alzheimer's-associated preclinical biomarkers of **inflammation, oxidative stress, and neurodegeneration**.

These effects were seen in many different cell and animal models. This suggests that there is a future possibility of an effective, sulforaphane-based strategy for **Alzheimer's prevention**.

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Super K Elite provides 2 additional forms of vitamin K and even **higher** potencies of K1, MK4, and MK7. **Super K Elite** costs **60 cents** a day and provides in one softgel:

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CAUTION: If you are taking anticoagulant or antiplatelet medications, or have a bleeding disorder, consult with your healthcare provider before taking these products.

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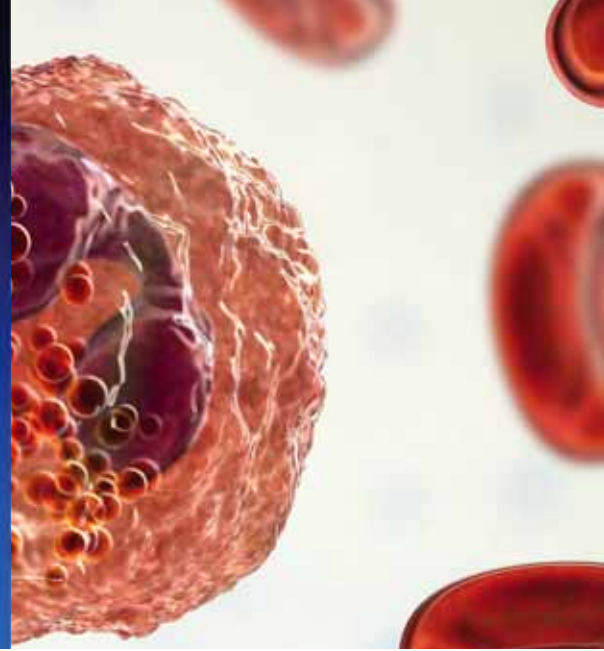
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RESOLVE PERSISTENT INFLAMMATORY ISSUES

BY RANDALL MILLER



Acute inflammation is an important part of the body's response to injury or infection. But when that inflammation does not **resolve** and becomes **chronic**, it causes major problems.

Chronic inflammation contributes to **accelerated aging** and almost *all* forms of persistent age-related disorders, including cancer, cardiovascular disease, and dementia.^{1,2}

Many compounds can **reduce** and lower the fires of inflammation. But scientists have discovered a group of unique compounds produced in the body that are required for the **resolution** of inflammation.

These compounds, called **pro-resolving mediators** or **PRMs**, can help return inflamed tissues back to their healthy state, resolving inflammation and its harmful long-term effects.

PRMs are a family of naturally occurring lipid mediators, sometimes also referred to as *Specialized Pro-resolving Mediators* (SPMs).

A recent article in the journal *BioFactors* examined the scientific and medical literature on **PRMs**, including evidence that they may help fight infection.³

Inflammation and Resolution

Acute inflammation is the body’s immune response to an immediate threat or injury, including tissue damage, irritation, toxins, and infections.

“First responder” immune cells enter the affected area from the bloodstream, working to eliminate the threat and defend the body from further harm.

After that, the inflammation should **resolve**.

However, inflammation does *not* always stop on its own. Instead, it can enter a longstanding “limbo” state and become **chronic inflammation**, doing damage for months or years to come.

This chronic inflammation underlies many diseases, such as diabetes, heart disease, cancer, and overall aging.^{4,5} Reducing inflammation throughout the body is helpful but not enough to completely restore health. Inflammation needs to be **resolved**.

Resolution of inflammation is a complex, active process guided by specific signaling compounds produced in the body.^{6,7} Among these compounds are **pro-resolving mediators (PRMs)**.

PRMs are different from **anti-inflammatories**. They do not simply *reduce* inflammation—they begin and guide the *resolution* of inflammation. They play an important role in getting tissues back to their healthy, functional state.⁸

Without adequate PRMs, inflammation can persist and do great harm.^{9,10}

Types of PRMs

For years, it has been known that **omega-3 fatty acids** found in fish oil have *anti-inflammatory* properties, but it was not fully understood why.

As it turns out, **PRMs** are fat- or lipid-based compounds. They are produced from oily substances, including the omega-3 fatty acids found in fish oils (such as **DHA** and **EPA**).

Adequate intake of these omega-3s is *required* for the production of adequate levels of PRMs in the body.

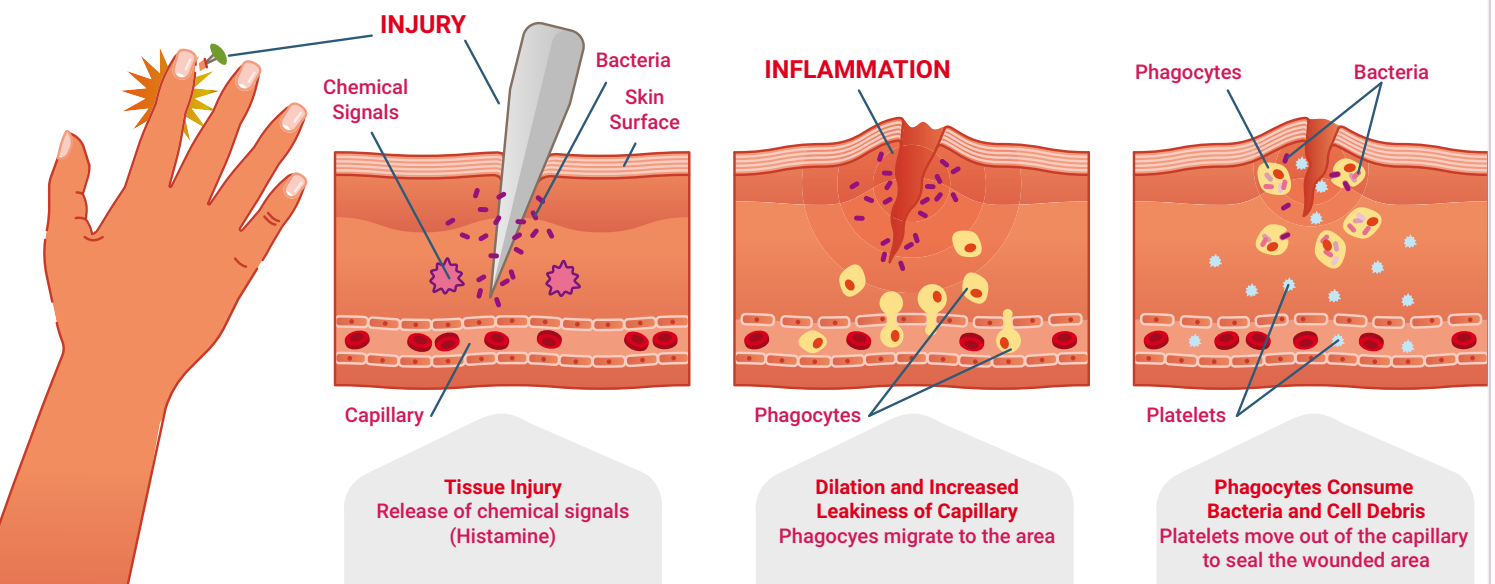
There are a number of different **PRMs** produced in the body:^{3,8}

- **E-series resolvins** are produced from EPA.
- **D-series resolvins, protectins, and maresins** are all produced from DHA.
- **Lipoxins** are synthesized from an omega-6 fatty acid known as **arachidonic acid**.

What PRMs Do

While each specific PRM has slightly different actions, they overlap and complement each other. Together, they help coordinate many of the processes involved in **inflammation resolution**.

Injury / Acute Inflammation





PRMs resolve inflammation and influence a healthy immune response by:^{3,8}

- Stopping the recruitment and migration of **immune cells** involved in acute inflammation,
- Inhibiting the production of **pro-inflammatory** compounds by immune system and tissue cells,
- Inhibiting the production of **free radicals**, used by immune cells in the fight against pathogens but which, if they persist, can cause tissue injury,
- Stimulating **macrophages** to clean up tissues. Macrophages do this by devouring and destroying bacteria, allergens, dead immune cells, and other debris,
- Increasing activity of immune cells that limit inflammation and then tidy up afterward, such as **regulatory T cells**,
- Reversing **hypersensitivity** of nerve endings that was activated in acute inflammation, reducing pain,
- Initiating **repair** and regeneration of damaged tissue, and
- Returning **blood flow** and blood vessels to normal.

Fighting Infection

Research has shown that **PRMs** also help fight **infections**.¹¹⁻²⁹

In patients with severe **periodontitis** (a bacterial infection of the gums which can lead to tooth and bone loss), levels of PRMs were significantly lower in patients than in the control subjects.¹⁴ Their macrophage cells were *less* efficient at clearing bacteria.

But when patients were given PRMs, the macrophage function was restored, *improving* their ability to eliminate bacteria and fight the infection.¹⁴

Pro-resolving mediators have shown protective effects in various other forms of infection and inflammatory disease.

Summary

Short-term **inflammation** is vital to fight infection, injury, and disease.

Once the threat has passed, compounds called **pro-resolving mediators (PRMs)** help *resolve* that inflammation, preventing it from becoming **chronic** and thus guiding the return of tissues to their healthy state. •

WHAT YOU NEED TO KNOW

PRMs and Inflammation

- **Acute inflammation** is an immune-system response to tissue injury, irritation, or infection.
- If inflammation lingers, it can become **chronic inflammation**, which is an important factor in aging and increases risk for practically every age-related chronic disease.
- Compounds known as **pro-resolving mediators (PRMs)** help *resolve* inflammation.
- **PRM precursors** have been shown to *increase* blood levels of PRMs.



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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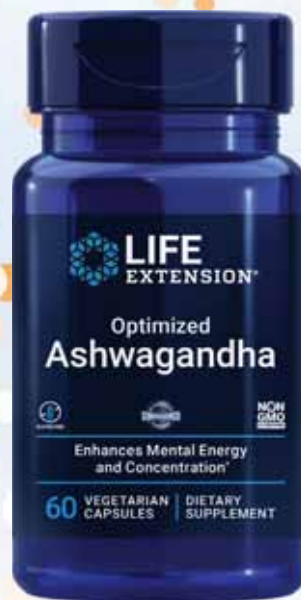
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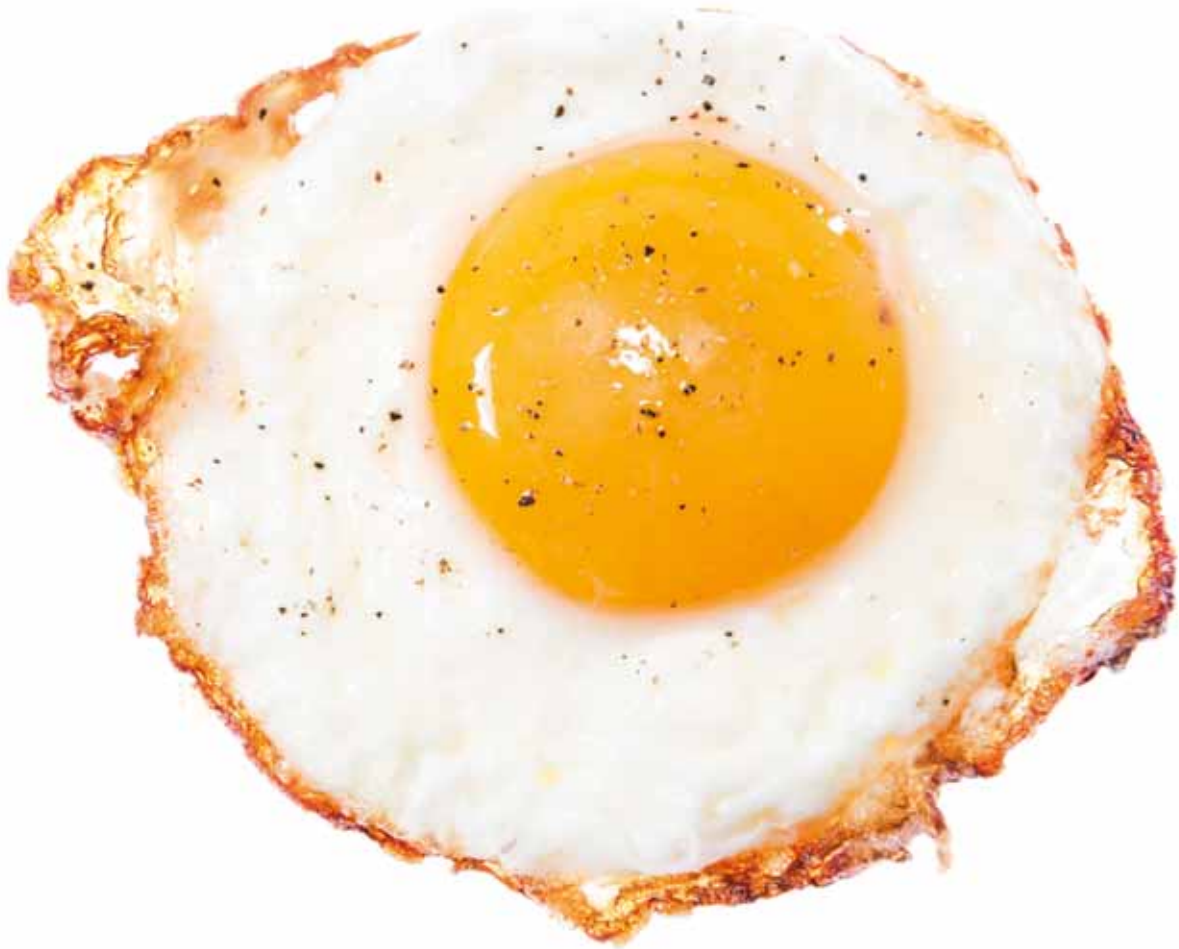
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What is Olive Leaf Extract?

BY CHANCELLOR FALOON



The **Mediterranean diet** is associated with a myriad of health benefits but is especially known for its positive effects on **cardiovascular** health.^{1,2}

This diet is *low* in animal products and saturated fat and *high* in **olive oil**, legumes, fruits, and vegetables, and includes moderate amounts of fish and seafood. It is associated with about a **30%** reduced risk of heart attack, stroke, and cardiovascular disease death.³

Many of the benefits of the Mediterranean diet are attributed to **olive oil** and its high **polyphenol** content.

The **leaves** of olives have even *higher* amounts of **polyphenols**, which suggests that they could be even *more* beneficial than the oil.⁴

Olive leaf extracts have received notable attention for their ability to lower **blood pressure**.^{5,6}

One study was conducted on **40 identical twins** with **hypertension** (high blood pressure). For eight weeks, patients received **olive leaf extract** or a **placebo**.⁵

In those taking **1,000 mg/day** of olive leaf extract, there was a mean drop in systolic pressure (the top number) of **11 mmHg** and a decrease in **diastolic pressure** (bottom number) of **4 mmHg**. Blood pressure in the placebo group was unchanged.

Newer research has shown additional benefits for cardiovascular and whole-body health.

Recent randomized controlled trials found that olive leaf extract:

- Decreased **inflammatory markers** among hypertensive patients compared to placebo, and⁷
- Reduced the number of sick days with an **upper respiratory illness** by **28%** among high school athletes.⁸

Preclinical data on olive leaf extract show that it:

- Provided **neuroprotection** in an animal model of multiple sclerosis,⁹
- Downregulated genes involved with cell-associated virulence factors and biofilm formation of a toxic **bacteria** called *P. aeruginosa*,¹⁰
- Demonstrated **anti-inflammatory** and **anti-atherogenic effects** in human coronary artery endothelial cells, and¹¹
- Consistently demonstrated **thyroid stimulating activities**.¹²

Olive leaves can also be made into **tea**. A recent clinical trial found that compared to green tea, **olive leaf tea** has a preventive effect against **anemia** and other red blood cell disorders.¹³

In another trial, consumption of olive leaf tea three times a day with meals for 12 weeks significantly

lowered **LDL (“bad”) cholesterol** and **triglycerides** in prediabetic patients.¹⁴

Research continues to show that olive leaf has clear benefits for cardiovascular and overall 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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What To Do About Heart Palpitations

BY DR. JOEL KAHN



Heart palpitations can be scary.

The feeling that your heart is beating too fast, pounding heavily, fluttering, or skipping beats, can have a variety of causes. Occasional palpitations are generally harmless—most people have them but are never aware of them—but sometimes require treatment or are a sign of an underlying problem, especially when they are recurrent or sustained.

In this interview, cardiologist **Dr. Joel Kahn** tells *Life Extension*[®] magazine about the causes of palpitations and how nutrients and other treatments can help. While most heart palpitations are benign and can be mitigated with nutritional therapy such as magnesium, it is best to schedule a visit with your physician to better understand your condition.

LE: What exactly *are* palpitations?

Dr. Kahn: The word **palpitation** means a rapid movement, trembling, or quivering motion of the heart. The Latin root is *palpare*, to “touch gently.” But in real life, palpitations may not be so gentle! Patients come to see me because they can feel their heart beat stronger, faster, or with an irregularity or thud that startles them. It may happen when they roll on their left side in bed, or when they are sitting and quietly reading, or perhaps before a business presentation.

LE: Just how common are these problems?

Dr. Kahn: All of us experience a normal number of premature beats at times. Prolonged heart monitors placed on military recruits or medical students have also identified a small number of skipped beats in the average person, and some skips

are indeed normal. Again, I recommend a visit to your physician to discuss the situation.

LE: What causes heart palpitations?

Dr. Kahn: A simple checklist most cardiologists consider is whether there is:

- A blood pressure issue,
- An overactive thyroid,
- Lung disease, such as emphysema,
- An electrolyte imbalance like a low potassium or magnesium level,
- Sleep apnea,
- A heart valve disorder,
- Stress,
- Congestive heart failure, or
- A prior heart attack.

Additional factors like age, hormonal changes (pregnancy, menopause, menstruation) anxiety, extreme fatigue, excess alcohol, excess caffeine, and stimulant medications like cold medications (i.e. pseudoephedrine) may also lead to palpitations. Of course, use of illicit drugs like cocaine or crystal meth may be a factor. Some people who perform ultra-exercise events like repeated marathons and triathlons may have as much as a **five-fold** increased risk of **atrial fibrillation** (Afib) despite excellent physical fitness.

While some palpitations can be monitored at home, a visit to a doctor is more pressing if there is known heart disease or a prior heart attack, if the palpitations are associated with chest pain, shortness of breath, dizziness, or blackouts, or if there is a family history of young members who have died suddenly.

LE: What do you do when someone comes to you with palpitations?

Dr. Kahn: Blood pressure, weight, diet patterns, and exercise history are obtained first. Reassurance is all that is needed in many cases, when there are minimal symptoms in young people without heart issues. But most of the time a search for a **root cause** of the palpitations is worthwhile. This is particularly true in people with medical issues like high blood pressure, in athletes, older individuals, those with heart disease, and people with additional symptoms like dizziness, near-blackouts, or shortness of breath.

Routine studies that may be needed include blood work for electrolytes, kidney function and



thyroid hormones, an **electrocardiogram** evaluation of the heart, extended heart monitoring by a Holter monitor (a portable electrocardiogram), and treadmill-exercise testing.

Palpitations cause a considerable amount of concern, yet there are often natural therapies that are very effective at resolving the symptoms. For younger and healthier people experiencing palpitations, trying natural therapies is worthwhile. Evaluating and avoiding potentially offending medications and stimulants like caffeine, improving sleep patterns, and managing stress with yoga, meditation, or tai-chi can be helpful. Further testing and consultation are recommended when these steps do not resolve palpitations.

LE: Are there nutrients that can help?

Dr. Kahn: Nutrients can play a key role in managing and eliminating palpitations of all kinds. The most helpful measure I offer patients is to increase **magnesium** intake. The Western diet can be quite low in magnesium due to a lack of fruits, vegetables, nuts, and seeds. Some caution is necessary in taking extra magnesium in those with moderate or advanced kidney disease, but most people can add **250-500 mg** a day of supplemental magnesium. Magnesium taken at night can help stop palpitations while also providing a restful night's sleep and improving bowel regularity, migraines, PMS, leg cramps, and blood sugar.

Palpitations often respond to additional nutrients. The combination of **magnesium** with **coenzyme Q10 (CoQ10)** is highly effective for most palpitations and often superior to prescription medication. **D-ribose** powder facilitates the



production of ATP energy by heart cells and is an important addition to magnesium and coenzyme Q10. **L-carnitine** added to these other nutrients facilitates the shuttling of fatty acids to fuel the ever-busy heart muscle cells. Finally, **taurine**, a sulfur-based amino acid, has allowed many people to gain control over their palpitations.

LE: How do you handle cases that don't respond to any of the treatments you've mentioned?

Dr. Kahn: In more serious cases of palpitations, particularly for persistent or recurrent atrial fibrillation, prescription medications like **beta-blockers** (which cause the heart to beat more slowly and with less force), electrical therapies like a shock called a **cardioversion**, and a procedure called **ablation** (which scars heart tissue to block abnormal electrical signals) may be discussed.

In most settings, though, considering and evaluating easily correctable causes of heart racing is warranted. Over and over again, simple nutrients that support the metabolic efficiency of the active heart muscle cells provide a path to quiet and calm the heart, relieve the skips and quivering, and restore 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.

Joel Kahn, MD, is the founder of the Kahn Center for Cardiac Longevity in Bingham Farms, Michigan.

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Radishes

BY LAURIE MATHENA



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Radishes make beautiful garnishes for vegetable platters and other dishes. But if you're only using these root vegetables as decoration, you're missing out on a host of health benefits.

Radishes have been used in Ayurveda and Traditional Chinese Medicine for centuries to treat ailments ranging from fevers to bile disorders. Similar to other cruciferous vegetables, radishes contain a variety of nutrients like potassium, folate, calcium, magnesium, and vitamin B12.

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- 01668 Melatonin • 300 mcg, 100 veg capsules
- 01083 Melatonin • 500 mcg, 200 veg capsules
- 00329 Melatonin • 1 mg, 60 capsules
- 00330 Melatonin • 3 mg, 60 veg capsules
- 00331 Melatonin • 10 mg, 60 veg capsules
- 00332 Melatonin • 3 mg, 60 veg lozenges
- 02201 Melatonin IR/XR
- 01787 Melatonin 6 Hour Timed Release
300 mcg, 100 veg tablets

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

VITAMINS

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

WEIGHT MANAGEMENT & BODY COMPOSITION

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

WOMEN'S HEALTH

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

THiNK
ZiNC
FOR IMMUNE HEALTH

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

Zinc promotes healthy immune responses.

Life Extension® provides **50 mg** of highly **absorbable** zinc in each vegetarian capsule.



Item #01813

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1 bottle \$6.75 • 4 bottles \$6 each



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

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

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



PROSTATE HEALTH

The best way to keep You in the picture.

Ultra Prostate Formula was created to help maintain prostate health. It contains a dozen ingredients to:

- Support healthy urination
- Promote healthy prostate function
- Support healthy prostate cell division

Ultra Prostate Formula is the most comprehensive *standardized*-ingredient prostate-health supplement.



Item #02029 • 60 softgels

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

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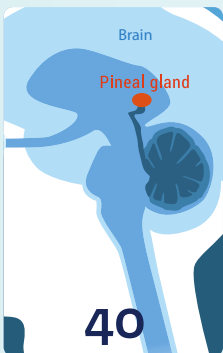


7 ANTI-CANCER EFFECTS OF BROCCOLI

In 1992, researchers at **Johns Hopkins** discovered robust **anti-cancer** properties of **sulforaphane**. Most oncologists are unaware of the potential of this **broccoli** compound.

28 PLANT-BASED MULTIVITAMIN

Extracts and powders from **12 plant foods** have been combined to provide the **phytonutrient** equivalent of **three servings of vegetables** and **two servings of fruits** plus vitamins and minerals.



40 MELATONIN'S BRAIN-PROTECTING PROPERTIES

Melatonin has been shown to improve memory and increase formation of new brain cells.

50 VITAMIN D REDUCES BREAST CANCER RISK

A study in the *British Journal of Cancer* found that the **risk of death** from breast cancer was **42% lower** in women with *high* vitamin D levels.



60 HOW TO OBTAIN BROCCOLI'S BENEFICIAL COMPOUNDS

A *dual-layered* delivery system increases *absorption* of **sulforaphane**, a **broccoli** compound with many health benefits.

70 RESOLVE PERSISTENT INFLAMMATORY ISSUES

Pro-resolving mediators (PRMs) *resolve* chronic inflammation, returning tissues to their healthy state.