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Lycopene

Nature's Most Potent Antioxidant Shows Broad Disease-Preventive Effects

By Liz Nakazawa



Lycopene, a powerful plant-based antioxidant nutrient, may offer protection from both cancer and heart disease. Lycopene is fast becoming known as nature's most potent antioxidant, with tremendous potential for helping to prevent disease and extend the healthy human life span.

Lycopene, a natural pigment synthesized by plants and microorganisms, is a member of the carotenoid family. The carotenoids are yellow, orange, and red pigments that include beta-carotene. Found in fruits and vegetables, the carotenoids are known for their potent antioxidant capabilities.

Lycopene gives tomatoes their reddish color. Indeed, tomato products such as spaghetti sauce are the richest food sources of lycopene, accounting for over 85% of the lycopene in the North American diet. Other foods such as watermelon, guava, and pink grapefruit contain smaller amounts of lycopene. Lycopene's bioavailability is influenced by heat, so cooked tomato products are better sources of lycopene than are raw tomatoes.¹ Because it is a fat-soluble nutrient, lycopene is best absorbed when consumed with a source of dietary fat.²

Lycopene scavenges and neutralizes free radicals, preventing oxidative damage that is associated with a number of chronic diseases.³ Of the common nutrients people supplement with—including vitamins E and C, and beta-carotene—lycopene has been shown to be the most efficient quencher of free radicals.⁴

While lycopene is best known for its role in the prevention of prostate cancer, current research suggests it may be valuable in guarding against other cancers, including lung, pancreatic and breast cancer, as well as in offering protection against cardiovascular disease.

Good For Your Prostate

Regular consumption of lycopene has been associated with a reduced risk of prostate cancer, the most common type of cancer in men and the second leading cause of cancer death in American men.⁵ The American Cancer Society estimates that in 2004, more than 230,000 new cases of prostate cancer will be diagnosed in the US. One in six American men will be diagnosed with prostate cancer during his lifetime.

In a recent study in China, researchers found that individuals consuming abundant dietary carotenoids, including lycopene, had a reduced risk of prostate cancer.⁶ Another study demonstrated that consumption of two to four servings of tomato sauce per week was associated with a 35% risk reduction in total prostate cancer and a 50% reduction of advanced (extraprostatic) cancer.⁷

Human prostate tissue is vulnerable to oxidative DNA damage.⁸ As a powerful antioxidant, lycopene has been demonstrated to significantly lower oxidative DNA damage in prostate tissue.⁸ Lycopene supplementation in men with prostate cancer has also been found to lower levels of prostate-specific antigen (PSA), a widely used marker of prostate cancer progression and response to treatment.⁹ (Elevated levels of PSA can also occur with age-related prostate enlargement and benign prostatic hyperplasia.)

Effects Against Other Cancers

In numerous epidemiological studies, dietary intake of tomatoes and tomato products has been associated with a lower risk of various cancers.¹⁰ In a study that examined cancer deaths in elderly people and their dietary intake of different fruits and vegetables, high intake of tomatoes was linked to a 50% reduction in mortality from cancers in all sites.¹⁰



Lycopene has been found to inhibit the proliferation of several types of human cancer cells in vitro, including lung and breast cancer cells.¹¹ Moreover, in-vivo studies have shown lycopene has tumor-suppressive activity.¹² Lycopene helped prevent the development of spontaneous mammary tumors in a strain of mice that are highly susceptible to tumor development.¹²

Lung cancer is the leading cause of cancer death in America. Animal studies suggest that dietary lycopene helps reduce the risk of lung cancers. Dietary lycopene dissolved in drinking water over the course of 21 weeks significantly decreased two types of lung adenomas along with carcinomas in male mice.¹³

Breast cancer is the second leading cause of cancer death in American women. Epidemiological studies have suggested that lycopene has a protective effect against breast cancer. Low levels of lycopene in the diet and in blood have been correlated with an increased risk of breast cancer.¹⁰ In

cell cultures, lycopene has been found to inhibit breast tumors more efficiently than alpha-carotene and beta-carotene.¹¹

Lycopene and Heart Disease

Researchers have hypothesized that the oxidation of low-density lipoprotein (LDL), which carries cholesterol into the bloodstream, plays an important role in the development of atherosclerosis, the underlying disorder leading to heart attacks and ischemic strokes. Antioxidant nutrients are believed to slow the progression of atherosclerosis by virtue of their ability to inhibit damaging oxidative processes. Of all the antioxidant nutrients, lycopene appears to be the most potent.

European researchers studied lycopene concentration and risk for cardiovascular disease. They found that men with the highest levels of lycopene in their adipose tissue were 48% less likely to develop cardiovascular disease. They also found that while lycopene consumption was cardioprotective, alpha-carotene and beta-carotene were not.¹⁴

Women also benefit from lycopene. A 2003 study by Harvard researchers found that women with the highest intake of lycopene had a reduced risk of cardiovascular disease compared to women with a low intake of lycopene. Women who consumed seven or more servings of tomato-based foods weekly saw a nearly 30% risk reduction in total cardiovascular disease compared to a group with intakes of less than 1.5 servings per week.¹⁵

A study in Finland measured lycopene blood levels and the thickness of the carotid artery wall. Researchers found a strong correlation between low blood lycopene concentrations and thickening of the carotid artery, which is associated with an increased risk of heart attack.¹⁶ The study authors concluded that low plasma lycopene concentrations are associated with early atherosclerosis.

Absorption and Toxicity

Cholesterol-lowering drugs, mineral oil, and fat substitutes may diminish the absorption of lycopene. Because dietary and supplemental fiber may also decrease lycopene absorption, it is best to take lycopene supplements along with non-fibrous meals.¹⁷ Beta-carotene and dietary oils such as olive oil may enhance the absorption of lycopene.

Lycopene is considered safe and non-toxic, and consumption is usually without side effects. Ingestion of extremely large quantities of lycopene has been associated with lycopenemia, a benign condition marked by an orange-yellow pigmentation of the skin.¹⁸



While scientific evidence concerning lycopene use in pregnancy is not available, no adverse effects have been reported in pregnant women consuming foods containing lycopene. During pregnancy and nursing, it is best to obtain lycopene from food sources rather than from supplements.

How Much Should You Take?

Although eating foods containing lycopene daily is recommended for optimal health, it can be difficult to obtain the appropriate daily servings. Nutritional supplements can help to ensure optimal daily lycopene consumption. While no ideal daily dosage has been established, practitioners of nutritional medicine often recommend 10-30 mg of lycopene daily to support optimal health. Larger doses of lycopene may be indicated for individuals with more serious health concerns.

With its protective effects against America's two leading killers—cardiovascular disease and cancer—lycopene should be considered an essential part of every healthy diet and supplement regimen.

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