

# Nutrition & Cataracts

Cataracts are a leading cause of visual impairment among aging Americans and a key quality of life issue. Cataract extractions are the most common surgical procedure performed in the U.S., accounting for more than two million procedures each year. Experts have theorized that if the progression of cataracts could be delayed by 10 years, the number of cataract surgeries per year would be reduced by 45 percent. Nutrition is one promising means of preventing or delaying the progression of cataracts.

## Cataracts

Cataracts develop when the proteins in the lens of the eye are damaged, causing them to become translucent or opaque. There are three types of major cataracts, depending on the location in the lens: nuclear, cortical and posterior subcapsular.

There are several factors that we cannot control that may increase the risk of developing cataracts. These include: age, family history and ethnicity (African Americans have a higher risk for developing and becoming blind from cataracts). Some studies also suggest that women may be at a slightly higher risk than men.

Research also shows that there are several risk factors for cataracts that we can control by changing certain behaviors. These preventive actions include: not smoking, reducing exposure to sunlight by wearing UVA/UVB protective eyewear and wide brimmed hats, controlling other diseases such as diabetes and eating a healthy diet.

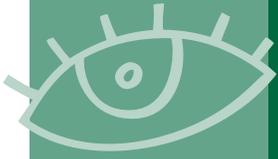
## Nutrition Link

Several research studies show that the antioxidant properties of vitamins C and E may protect against the development and progression of cataracts. Early evidence also suggests that the carotenoids lutein (pronounced loo-teen) and zeaxanthin (pronounced zee-uh-zan-thin), which are also antioxidants, may also be protective against cataracts.

## Research – Antioxidant Vitamins

Some recent studies compared diet and supplement intake of the antioxidant vitamins C and E with the development of cataracts. Many of these studies have shown that these antioxidants may decrease the development or progression of this disease. Some of the results are listed below:

- The Nutrition and Vision Project found that higher intakes of vitamin C led to a reduced risk for cortical and nuclear cataracts. Results also showed that people who used vitamin C and E supplements for more than ten years had decreased progression of nuclear cataracts.
- A recent analysis of results from a national dietary study (Second National Health and Nutrition Examination Survey) found that higher levels of vitamin C in the diet were associated with lower risk of cataracts.



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- In the Nurses' Health Study, the need for cataract surgery was lower among women who used vitamin C supplements for ten years or longer.
- The Roche European American Cataract Trial found that an antioxidant supplement with vitamins C and E and beta-carotene lead to a small decrease in the progression of cataracts in less than 3 years.
- In the Longitudinal Study of Cataract, vitamin E supplement use for at least a year was associated with a reduced risk of nuclear cataracts becoming more severe.
- The five year follow-up to the Beaver Dam Eye Study showed a reduced risk for nuclear and cortical cataracts among people using multivitamins or any supplement containing vitamins C and E.

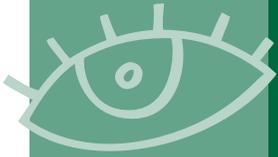


## Research – Lutein and Zeaxanthin

Lutein and zeaxanthin are promising nutrients in the fight against cataracts. Lutein and zeaxanthin are the only carotenoids found in the lens. Several recent studies have examined these two nutrients and their relationship to reducing the risk of developing cataracts:

- The Nurses' Health Study found that high amounts of lutein+zeaxanthin were associated with a reduced need for cataract surgery. On average, people had intakes around 6 milligrams (mg) of lutein+zeaxanthin each day.
- The Health Professional's Follow-Up Study also found that eating foods with high amounts of lutein+zeaxanthin (6.9 mg per day) were correlated with a reduced need for cataract surgery.
- The five-year follow-up to the Beaver Dam Eye Study showed that people with the highest intakes of lutein+zeaxanthin had a significantly lower risk for developing new cataracts than those with the lowest intakes.
- A recent study in England found that people with the highest amount of lutein in their blood, resulting from regular consumption of good food sources of lutein, had the lowest risk for posterior subcapsular cataracts.





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## What You Need to Know

Given the positive association between nutrition and cataracts, it seems prudent for people to increase the amount of certain antioxidants in their daily diet. Eating five servings of fruits and vegetables each day as currently recommended by the National Cancer Institute and U.S. Department of Agriculture can provide more than 100 mg vitamin C and 5 to 6 mg of carotenoids, including lutein and zeaxanthin, given wise choices of fruits and vegetables. Eating two servings of nuts and seeds can provide 8-14 mg vitamin E (11.9-20.8 IU) (see tables for good food sources of these nutrients).

However, the majority of people in the U.S. are not eating five servings of fruits and vegetables and good food sources of vitamin E each day. The average daily diet contains approximately 100 mg vitamin C, 1-7 mg lutein and zeaxanthin and 8 mg vitamin E (or 12 IU). In the studies mentioned here, the levels associated with benefit were considerably higher than the current average intake. If you find it difficult to increase the level of these antioxidants and carotenoids in your diet, multivitamin/mineral and eye health supplements containing these nutrients are available.

## Nutrient Values Tested

| Nutrient                | Recommended Dietary Allowance (RDA) <sup>1,2</sup>     | Levels Associated with Health Benefit | Percent of People Getting Less than 100% of RDA <sup>1,2,3,4</sup> |
|-------------------------|--|---------------------------------------|--|
| Vitamin C               | 90 mg for men<br>75 mg for women<br>+35 mg for smokers | ≥ 250 mg                              | More than 50% of individuals                                       |
| Vitamin E*              | 22 IU (15 mg) natural<br>33 IU (30 mg) synthetic       | ≥ 100 IU                              | More than 90% of individuals                                       |
| Lutein and Zeaxanthin** | –  | 6 mg                                  | Average intake per day 1.7 mg                                      |

\* The Food and Nutrition Board reported two different RDA values for vitamin E depending on synthetic or natural source.

\*\* There is no RDA for lutein, zeaxanthin and beta-carotene.

<sup>1</sup>Dietary Reference Intakes for Vitamin C, Vitamin E and Carotenoids. Institute of Medicine, 2000.

<sup>2</sup>Dietary Reference Intakes for Vitamin A and Zinc. Institute of Medicine, 2001.

<sup>3</sup>Vitamin and mineral data was obtained from CSFII, 1994-1996. Values correspond to all individuals.

<sup>4</sup>Carotenoid data was gathered from NHANES III, 1988-1994.





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## Food Sources

Most fruits and vegetables are excellent sources of vitamin C, including oranges, grapefruit, strawberries and papaya, as well as green peppers and tomatoes.

Vitamin E is more difficult to obtain from food sources alone since it is found in very small quantities in foods, such as vegetable oils, nuts and seeds. Good food sources include vegetable oils (including safflower and corn oil), almonds, pecans, wheat germ and sunflower seeds.

Lutein and zeaxanthin are found together in many food sources. Dark green leafy vegetables are the primary source of lutein and zeaxanthin, but they are also present in lesser amounts in other colorful fruits and vegetables, such as broccoli, orange peppers, corn, peas, persimmons and tangerines.

## Good Food Sources of Vitamin C (mg/serving)

| Food                             | Amount     | Vitamin C |
|----------------------------------|------------|-----------|
| Orange juice, fresh squeezed     | 1 cup      | 124       |
| Grapefruit juice, fresh squeezed | 1 cup      | 94        |
| Papaya                           | 1/2 medium | 94        |
| Cantaloupe                       | 1/4 melon  | 86        |
| Orange                           | 1 medium   | 80        |
| Green peppers, raw chopped       | 1/2 cup    | 67        |
| Tomato juice                     | 1 cup      | 44        |
| Strawberries                     | 1/2 cup    | 43        |
| Broccoli, raw chopped            | 1/2 cup    | 41        |
| Grapefruit                       | 1/2 medium | 40        |

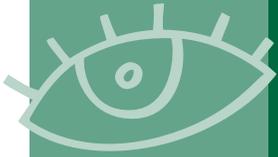
Source: USDA Nutrient Database for Standard Reference Release 13

## Good Food Sources of Vitamin E (mg/serving)

| Food            | Amount  | Vitamin E     |
|-----------------|---------|---------------|
| Almonds         | 1/4 cup | 9.3 (13.9 IU) |
| Sunflower seeds | 1/4 cup | 5.8 (8.7 IU)  |
| Safflower oil   | 1 tbsp  | 4.7 (7.0 IU)  |
| Peanuts         | 1/4 cup | 3.3 (4.9 IU)  |
| Peanut butter   | 2 tbsp  | 3.2 (4.8 IU)  |
| Corn oil        | 1 tbsp  | 2.8 (4.2 IU)  |

Source: USDA Nutrient Database for Standard Reference Release 13





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## Good Food Sources of Lutein and Zeaxanthin (mg/serving)

| Food/Serving (1 cup) | Lutein and Zeaxanthin | Lutein      | Zeaxanthin |
|----------------------|-----------------------|-------------|------------|
| Kale                 | 20.5 - 26.5*          | —           | 1.1 - 2.2* |
| Collard greens       | 15.3                  | —           | 5.1        |
| Spinach              | 3.6 - 12.6*           | 1.7 - 13.3* | 0.5 - 5.9* |
| Turnip greens        | 12.1                  | —           | 0.4        |
| Broccoli             | 2.1 - 3.5*            | 1.4 - 1.6*  | —          |
| Corn, yellow         | 1.4 - 3.0             | 0.6         | 0.9        |
| Peas, green          | 2.3                   | 2.2         | —          |
| Orange pepper        | —                     | —           | 1.7        |
| Persimmons           | 1.4                   | —           | 0.8        |
| Tangerine            | 0.5                   | —           | 0.2        |

\*depending on variety and preparation

Source: USDA-NCC Carotenoid Database, 1998  
USDA Food Nutrient Database for Standard Release 13  
Hart and Scott, 1995

