

# Nutrition and eye health

**Support throughout central vision loss**

A healthy diet is an important part of looking after your eyes.

**No one need face macular degeneration alone.  
For information and support call 0300 3030 111.**

Good nutrition is important for general health and eye health. It helps the body grow, repair and protects against infection.

There are several types of macular condition, some genetic. The most common is age-related macular degeneration (AMD). The causes of AMD are not fully understood.

Scientists believe several factors are responsible, including age, genes, smoking, exposure to sunlight and our diet. Diet is thought to be important because certain nutrients protect

the body from damaging substances called oxidants.

Oxidants, including free radicals, are thought to be partly responsible for the ageing process. In the eye they may contribute to the development of AMD because they speed up cell degeneration.

Other substances, called antioxidants, reduce this harmful effect. Vitamins A, C and E are powerful antioxidants. Another group of substances called carotenoids are also effective against oxidants. Many of these substances can only

be obtained from our food. Two of the most important carotenoids are thought to be lutein and zeaxanthin.

### Lutein

Lutein and zeaxanthin are yellow plant pigments which give certain foods their colour, for example the yellow and orange in peppers, sweetcorn and saffron.

Green leafy vegetables such as kale, spinach and broccoli also contain high levels of lutein. You can actually see the lutein as the vegetables age and turn yellow.

Lutein and zeaxanthin are found in high concentrations in the macula of the eye. A third substance, meso-zeaxanthin is formed in the body from lutein.

Within the macula these three carotenoids are known as ‘macular pigment’. They are thought to play an important role in absorbing damaging blue wavelengths of light. They act as a natural sunblock for the macula and can counteract the effects of the damaging free radicals.

Some studies have suggested that people with low levels of macular pigment may be more likely to develop AMD. Some people may have naturally low levels of macular pigment but weight and diet may also be factors.

The human body cannot make lutein or zeaxanthin. They have to be eaten.

Several studies suggest that eating at least 10mg of lutein a day has the most beneficial effects on macular pigment levels. The average western diet is thought to contain

no more than 3mg of lutein and zeaxanthin a day.

## What should I eat?

It's important to have a wide range of foods in your diet. However, the list below shows which vegetables have the highest amount of lutein.

### Lutein in vegetables milligrams (mg)/100g (fresh)<sup>1</sup>

Kale	11.4 mg
Red pepper	8.5 mg
Spinach	7.9 mg
Lettuce	4.7 mg
Leek	3.6 mg
Broccoli	3.3 mg
Peas	1.7 mg

Vegetables should usually be lightly boiled, steamed, or microwaved. Light cooking increases the **bioavailability** of the lutein; that is the ease with which the body can extract the lutein. Too much cooking destroys it.

Kale is by far the best source of lutein and has good bioavailability, even when it is raw.

Eggs contain high levels of lutein and zeaxanthin, and these carotenoids may more easily be absorbed by the body because they are eaten with the fat contained in the egg. Zeaxanthin is also found

in orange and yellow fruits and vegetables such as sweetcorn and orange bell peppers. Many of these overlap with foods containing vitamins C and E.

### **Should I take a supplement?**

Western diets in general contain too little lutein, zeaxanthin and other antioxidants and some people find it difficult to prepare and cook fresh food every day. Others may not absorb antioxidants efficiently.

As a result there has been a lot of interest in the potential

role of nutritional supplements. Studies into the benefits of taking supplements are conflicting. However, two very large studies have suggested that certain nutritional supplements can slow down the progression of AMD in people already with the condition in one or both eyes.

The first Age-Related Eye Disease Study, AREDS1, was published in 2001. It found that a high dose of vitamins C and E plus a carotenoid called beta carotene together with zinc could reduce the risk of progression to advanced AMD by 25%.

AREDS1 supplements have been available for some years and are recommended by many eye specialists.

A second AREDS study was published in May 2013. This study added lutein, zeaxanthin and omega-3 to the original AREDS formula to see if this new combination worked better than the first one.

Overall this more recent study found that adding lutein, zeaxanthin and omega-3 all together did not reduce the progression of AMD any more than the original AREDS supplement.

However two groups of participants did show a greater benefit than those just taking the original AREDS1 formula.

These were people who:  
(a) took lutein and zeaxanthin without the beta carotene and  
(b) people who had a low level of lutein and zeaxanthin in their diet.

The study investigators suggest that beta carotene competes with lutein and zeaxanthin for absorption by the body.

In addition, the AREDS2 study found that former smokers who took the original AREDS preparation with

beta carotene were more at risk of lung cancer and so recommend it is removed from the formula.

AREDS2 investigators say that a new AREDS formula supplement should contain:

Vitamin C	500mg
Vitamin E	400 IU
Copper	2mg
Lutein	10mg
Zeaxanthin	2mg
Zinc	25mg or 80mg

Two levels of zinc were tested in AREDS2. Both showed the same effect so either dose is acceptable. Omega-3 was not found to be

beneficial in this trial, although other trials have reported a benefit.

Some scientists believe that another macular carotenoid, meso-zeaxanthin, is also important for macular health. This is made by the body from lutein. It was not tested in the AREDS trials and not all scientists agree on its significance. More research is needed in this area.

Meanwhile it is widely agreed that if you eat a healthy diet including at least five portions of fruit and vegetables a day, you should not need a supplement.

So, while supplements shouldn't be seen as a substitute for a healthy diet, they may be useful in some circumstances. You should also make sensible changes such as stopping smoking.

**Smoking increases the production of the damaging free radicals. People who smoke are up to four times more likely to develop AMD than those who don't, regardless of genetic risk.<sup>2</sup> If you need help to stop smoking please speak to your GP.**

These measures will boost your general health and may help reduce the impact of AMD.



There are lots of supplements on the market. Not all have sound clinical research to support their claims. Beware of any which claim to “cure” macular degeneration.

**Please talk to your GP before taking supplements or making major changes to your diet, especially if you take other medications.**

People who take warfarin, for example, may need to avoid high doses of omega-3 as it thins the blood. Vitamins E and K may also interact with medicines like warfarin and aspirin. Vegetables such as kale and spinach

have high levels of vitamin K as well as lutein. Beta carotene has been linked to an increased risk of lung cancer in smokers and ex-smokers.

As lutein and zeaxanthin are fat soluble they may be more easily absorbed when taken as oil capsules rather than tablets.

**While we believe that taking supplements containing lutein may be beneficial to eye health, we do not endorse any brand.**

## References

1. Maiani, G. et al, 2009, 'Carotenoids: Actual knowledge on food sources, intakes, stability and bioavailability and their protective role in humans', Mol. Nutr. Food Res., vol 53, pp. 194-218.
2. Tan, JSL et al, 2007, 'Smoking and the long-term incidence of age-related macular degeneration: the blue mountains eye study', Arch Ophthalmol., 125(8), pp. 1089-1095.

## Macular Society services

The Macular Society is the national charity for anyone affected by central vision loss. We provide free information and support to improve lives today. We fund research so that one day we can overcome macular disease.

You don't have to be a member of the Society to use our services. We provide:

**Befriending** – social phone calls from someone with experience of macular disease.

**Support groups** – help accessing treatments.

**Counselling** – confidential telephone service.

**Skills for seeing** – training to make best use of remaining sight.

**Treatment buddy** – about to have injections for macular disease? Chat to people who've had treatment for support and advice.

**Charles Bonnet buddy** – contact others who've experienced visual hallucinations as a result of a macular condition.

**Helpline** – advice and information on all aspects of macular disease, including diagnosis, treatment and living with central vision loss.

**Call 0300 3030 111**  
**Monday – Friday**  
**9am – 5pm**  
**help@**  
**macularsociety.org**

## **Join us**

Many people join the Macular Society to make a difference.

Your support helps us provide services and fund research into a cure. One day we will overcome macular disease.

**To join as a member or regular supporter:**

**01264 350 551**

**info@**  
**macularsociety.org**

If you've found this leaflet useful please consider making a donation to support our work.

  
**Macular Society**

**Support throughout central vision loss**

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