

# Linoleic acid

# Fact Sheet

Multiple  
Sclerosis  
Trust

MS

Information

Education

Research

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# Linoleic acid

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## **1. Introduction**

This factsheet provides background information about why linoleic acid is thought to be important for people with some types of MS. For individual dietary advice, ask your GP to refer you to a dietician.

## **2. What is linoleic acid?**

Linoleic acid is a naturally occurring essential fatty acid, present in a variety of foods, including the oils of seeds and nuts, such as sunflower, safflower, soya, corn seeds or walnut oils. Fat is needed in the diet in order to provide essential fatty acids. It is also a major source of energy (calories). Fats consist of a mixture of fatty acids, the proportions of which determine the type of fat.

There are two kinds of fat:

- saturated fat - normally hard at room temperature. This is found in meat and animal fats (eg lard), and dairy products such as butter and hard cheese;
- unsaturated fats – usually soft or liquid at room temperature. Found in margarine, and vegetable, seed and fish oils.

There are two types of unsaturated fats:

- monounsaturated – found in olive oil;
- polyunsaturated – essential fatty acids are the building blocks of polyunsaturated fats. The body is unable to make polyunsaturated fatty acids itself, so it is essential that they are consumed through the diet, hence they are also known as essential fatty acids.

Research has shown a link between a high intake of saturated fat and an increased risk of heart disease and certain cancers, suggesting that a diet low in saturated fat is desirable.

Monounsaturated fats are better for the heart than saturated fats, but do not have any proven benefits for MS.

Polyunsaturated fats have been the focus of the majority of studies into diet and MS. Polyunsaturated fats are further divided into two important forms: omega 3 essential fatty acids and omega 6 essential fatty acids. It is important to achieve a balance between these two groups, so it is recommended that foods containing both types are included in the diet.

Omega 3 essential fatty acids are present in oily fish such as salmon and mackerel. Other sources include leafy green vegetables and linseed oil. Omega 3 essential fatty acids are important as part of a balanced diet, but the main benefit for MS has been found with omega 6 essential fatty acids.

The main omega 6 essential fatty acid is linoleic acid.

### **3. Why linoleic acid is important**

In the early 1980s, three separate trials were conducted, looking at the importance of dietary linoleic acid for people with MS<sup>1</sup>. 181 people with MS took part, 90 people receiving linoleic acid and 91 receiving oleic acid, a non-essential fatty acid that is naturally present in olive oil, as a control substance.

Two of the trials gave participants 17 grams (g) daily of linoleic acid, in the form of sunflower oil, with 8g daily of olive oil as the control substance. The third trial gave participants 23g daily of linoleic acid in the form of a sunflower spread, with participants in the control group receiving 16g of olive oil spread daily.

Patients on the trials were followed for an average of two years. Everyone included in the trials was able to walk, and whilst two of the trials looked only at relapsing/remitting MS, one trial also included people with progressive MS. Participants in the trials were examined at least every six months, for changes

to their levels of ability on the Expanded Disability Status Scale - a neurological rating scale. Any relapses that had occurred since the previous visit were also recorded.

Results from these trials showed that people receiving linoleic acid showed less accumulation of disability over time, compared with those people who received oleic acid. This was most noticeable in people who had little or no disability when they started on the trial, suggesting that linoleic acid is of most benefit to people who are newly diagnosed.

Linoleic acid did not appear to affect the number of relapses that people had. A more marked effect was seen on the severity and duration of relapses. Those people who received linoleic acid experienced shorter relapses, whatever their level of disability when the trials started.

There is no evidence that increasing linoleic acid benefits people with progressive MS as an insufficient number of people with this type of MS were included in the trials.

Based on this research, the NICE Guideline for the Clinical Management of MS<sup>2</sup> recommends linoleic acid for people with relapsing/remitting MS as a treatment that may help to slow the disabling effects of MS. However, since the NICE Guidelines were published, a subsequent review has cast doubt on the quality of the original research trials and called for further research in this area<sup>3</sup>.

#### **4. What is the best dose of linoleic acid?**

These research trials gave people with MS 17-23g of either sunflower spread or sunflower oil, thus forming the basis of NICE's recommendation about amounts of linoleic acid.

However, it was noted by the researchers that it was unclear whether this was the optimum amount of linoleic acid. For people who have a poor appetite, or who are trying to lose weight, these levels may well not be desirable. Other downsides of linoleic acid can be that the oily taste may be unpleasant and can cause diarrhoea in some people.

**It is not advisable to increase your linoleic acid intake without making other changes to your diet. If in any doubt, ask your GP to refer you to a dietician.**

Linoleic acid should be considered in the context of a balanced diet, which is low in total fat and includes five portions of fruit and vegetables a day.

- Saturated fat intake should be reduced; otherwise the total amount of fats will be unhealthily high. It will also compete with the essential fatty acids. This can be achieved by reducing fatty meat and processed meat products, full fat dairy products (butter, full cream milk, cheese, cream), bought baked products (cakes, biscuits), pastry, crisps, chips and products containing significant amounts of hydrogenated vegetable fats.
- Fruit and vegetable intake should be at least five portions per day. This is to provide antioxidant nutrients to combat oxidative stress. Oxidative stress is the condition that occurs when substances produced within the body react and cause damage to cells. Antioxidants can convert these substances into harmless substances such as oxygen and water. Increasing the amount of essential fatty acids without increasing these protective nutrients could increase the amount of oxidative stress. A portion of fruit could be an apple, a small banana, two plums or a small glass of fruit juice. A portion of vegetables could be two-three tablespoons of cooked vegetables (fresh, frozen or tinned), or a small bowl of salad.

- A balance between essential fatty acids is important, so try to include some omega 3 fatty acids, for example by eating a portion of oily fish weekly (eg mackerel, sardines, salmon).

## **5. Sources of linoleic acid**

The research suggests that linoleic acid works well in whatever form it is taken. Sources of linoleic acid include full fat sunflower margarine or sunflower, safflower or sesame seed oils. It can be used in salad dressings, neat from the bottle, or as a spread on toast, bread or crackers. To get the benefit of the linoleic acid, oil or spreads should not be heated, and should be stored in cool, dark conditions, such as a cupboard.

Alternatively, or additionally, supplements can be taken, although it may be difficult to consume enough linoleic acid in this way.

If you have a good appetite it is likely that you will take 17-23g of linoleic acid a day through your daily food. The following provide 3.5-4.5g of linoleic acid<sup>3</sup>. Choose **5 portions** each day to achieve the target:

### **5.1. Margarine and oils**

- 3 level teaspoons (12g) of full fat polyunsaturated margarine, for example, sunflower, corn, safflower or soya;
- 2 teaspoons (8g) of corn oil, cotton seed oil, soya oil, walnut oil or wheatgerm oil;
- 1 teaspoon of safflower oil or sunflower oil.

### **5.2. Nuts and seeds**

- 10-15g of walnuts, brazil nuts, sesame, sunflower, pumpkin or poppy seeds;
- 20-30g of peanuts, peanut butter or almonds.

### **5.3. Miscellaneous**

- 2 teaspoons (10g) of full fat mayonnaise;
- 30g of full fat soya flour;
- 35g of taramasalata or soya dessert topping.

### **5.4. Supplements**

- 5.8g (5800mg) blackcurrant seed oil\*;
- 4.5g (4500mg) evening primrose oil\*;
- 5.3g (5300mg) grape seed oil.

\*including gamma linolenic acid (GLA) content.

### **5.5. Gamma linolenic acid (GLA)**

GLA is another omega-6 essential fatty acid. There is some theoretical evidence that GLA may also be beneficial in MS. Studies in animals show that GLA suppresses immune system activity and decreases the severity of an MS-like disease. However, these benefits have not been replicated in human studies, with mixed results from clinical trials. The main source of GLA is evening primrose oil, which contains around 8-10% GLA and approximately 70% linoleic acid. Obtaining enough GLA or linoleic acid through evening primrose oil capsules alone is very difficult. Because of the mixed research results there are no evidence-based recommendations for dosages of GLA<sup>5</sup>.

NB. Supplements are more expensive than dietary sources of linoleic acid. If you are in any doubt ask your GP or consultant for a referral to a dietician.

## 6. References

1. Dworkin RH, Bates D, Millar JHD, Paty DW. Linoleic acid and multiple sclerosis: a reanalysis of three double-blind trials. *Neurology* 1984; 34: 1441-5.
2. Multiple sclerosis - understanding NICE guidance - information for people with multiple sclerosis, their families and carers, and the public. London: NICE; 2003.
3. Farinotti M, Simi S, Di Pietrantonj C, et al. Dietary interventions for multiple sclerosis. *Cochrane Database Systematic Review* 2007; (1): CD 004192.
4. Fatty acids. Seventh supplement to 5th edition of McCance and Widdowson's "The composition of foods". Cambridge: The Royal Society of Chemistry; 1998.
5. Bowling AC. Complementary and alternative medicine and multiple sclerosis. 2nd edition. New York: Demos; 2007.

*We are very grateful to Bernice Chiswell, Senior Dietician, Bedford Hospital NHS Trust and Bedfordshire and Northamptonshire MS Therapy Centre, for her help in compiling this factsheet.*

## Publications

We hope that you have found this information helpful. The MS Trust offers a wide range of publications, including our quarterly newsletter *Open Door*, which provides an update on research and latest developments. Our website is regularly updated [www.mstrust.org.uk](http://www.mstrust.org.uk)

**Contact us to receive our newsletter or to request another publication.**

**All our services are free within the UK, but your donation allows us to continue our work.**

## MS Trust Information Service

The MS Trust Information Service is here to answer YOUR questions about MS. To contact us you can:

**phone** 01462 476700 (Lines are open Monday – Friday 9am-5pm)

**email** [infoteam@mstrust.org.uk](mailto:infoteam@mstrust.org.uk)

**write** MS Trust  
Spirella Building, Letchworth Garden City, SG6 4ET

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