



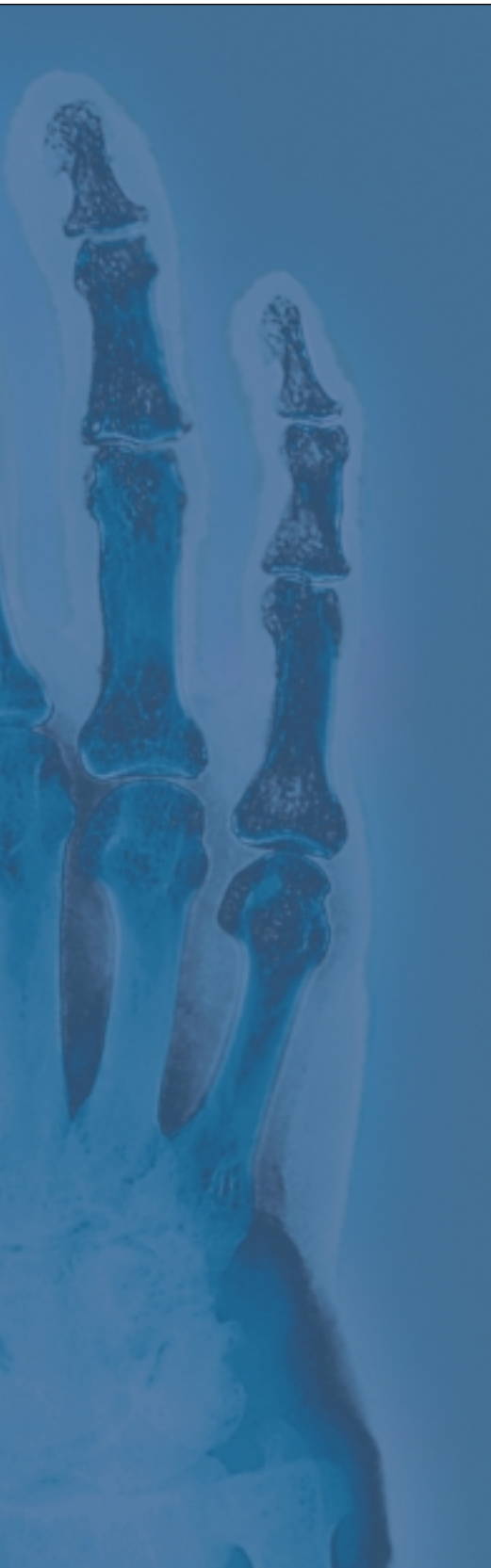
# Arthritis: A Nutritional Approach



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## INTRODUCTION

Most of the British population develops arthritis, usually osteoarthritis. Ideally we should see patients early enough to prevent it. Often, unfortunately, we only meet people when arthritis has already occurred. We should then explain how a change in diet can remove pain and restore mobility. We can also prescribe nutritional supplements, relevant to the type of arthritis, while addressing any other dietary and nutritional needs the person has.



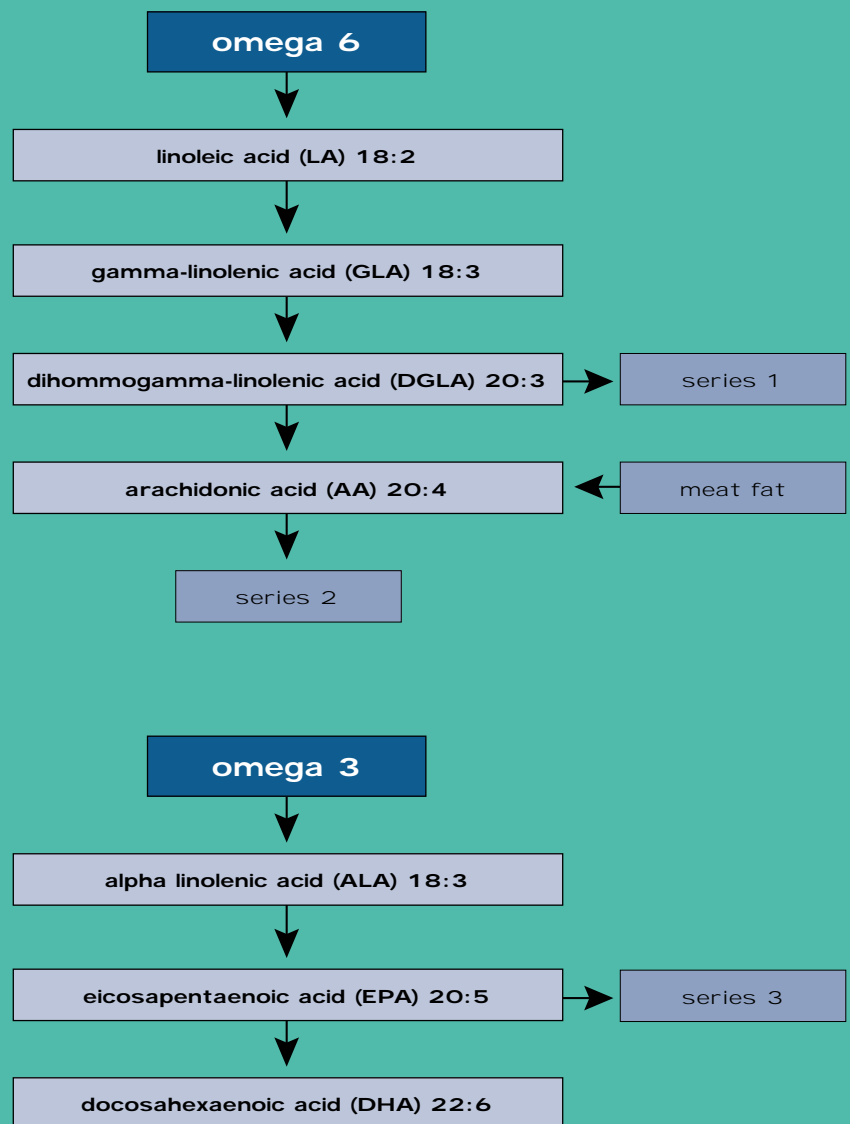
In considering any inflammatory condition, we must consider hormones called prostaglandins, which control inflammation. We should consider whether the person makes enough sulphate, which acts as an anti-histamine, and which is required for gut wall integrity. Lectins present in foods are involved in arthritis, and dietary intake of high lectin foods should be discouraged in arthritics. Certain sugars protect against these lectins. In some types of arthritis, antibodies to particular gut bacteria may harm the body, and beneficial bacteria can be provided, to alter the balance of the gut flora. Methylation may also be inadequate, perhaps because of inadequate intake of B vitamins and magnesium. Manganese should be provided, for cartilage production.

**PROSTAGLANDINS**

Series 3 prostaglandins are made from the omega 3 fatty acid, eicosapentaenoic acid (EPA, 20:5 \_3) in fish oil.<sup>1</sup> Their ability to reduce inflammation makes them relevant to a variety of diseases, from arthritis to asthma and coronary heart disease.<sup>2,3,4,5</sup> They reduce the production of cytokines.<sup>2,6,7</sup> Cytokines slow down the formation of sulphate from the amino acid cysteine. Some people are happy to eat plenty of fish. They should be cautioned to concentrate on those fish, which contain less mercury, as mercury toxicity can cause many symptoms.<sup>8</sup> People who dislike fish may take fish oil capsules. These should be from a reputable brand, with minimal pollution. Children may have fish oil from a bottle. Cod liver oil should be avoided, as it contains much vitamin A and D, and the liver is likely to contain toxins the fish has not yet made safe. Vitamins are better given in the form of a general vitamin supplement, which includes all the vitamins in a balanced formulation.

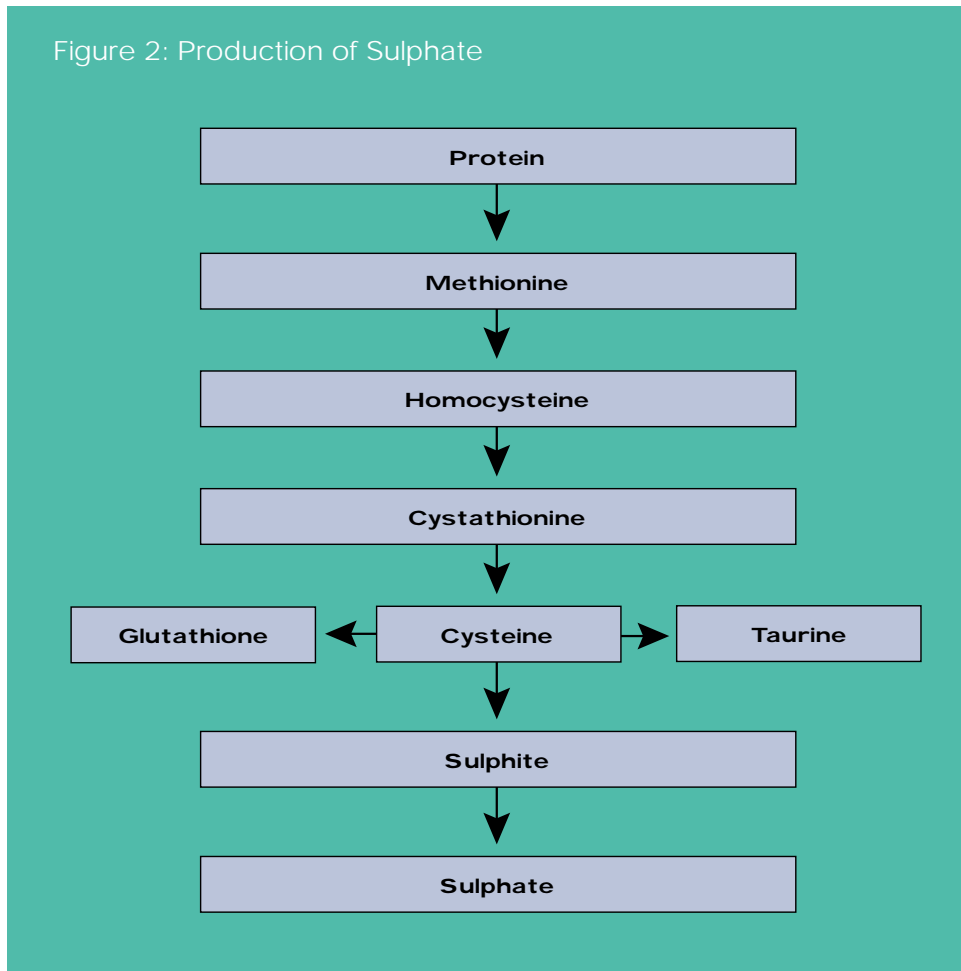
Flax oil provides the omega 3 fatty acid, alpha linolenic acid (ALA, 18:3 \_3), which needs much processing to convert to EPA. For this conversion to take place, there must be adequate levels of the vitamins and minerals involved.<sup>9</sup> Even if a person takes flax seed oil together with the relevant vitamins

Figure 1: Conversion of Linoleic Acid and Gamma Linolenic Acid to Prostaglandins.



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Figure 2: Production of Sulphate



and minerals, only a small proportion of the flax oil is converted to EPA.<sup>10</sup> Some other oils, like hemp, soya and walnut, contain ALA, but flax is the richest. Those who avoid fish should take at least two dessertspoons of flax oil a day. It should be kept in the refrigerator, and not cooked. Omega three fats have several double bonds, and are easily damaged by heating.<sup>9</sup> Fish should be cooked, because of parasites, but the cooking needs to be gentle.

Series 1 and 2 prostaglandins, *see Figure 1*, are made from omega 6 fats in sunflower seeds, sesame seeds, nuts, maize, and evening primrose oil.<sup>9</sup> Most of the omega 6 fat in food is linoleic acid (18:2\_6). It has to be processed to gamma linolenic acid (GLA, 18:3\_6). This can be provided by evening primrose oil. Blackcurrant seed oil and borage (starflower) oil are sometimes used.<sup>11</sup> However, plant oils are a mixture of chemicals, and there is no guarantee that all GLA containing oils will have the effects shown in research on evening primrose oil. Horrobin reported that the other oils were less effective than evening primrose.<sup>12</sup> Caution is also needed when using such oils. For example, borage and blackcurrant oils may contain harmful ingredients.<sup>9,12</sup>

GLA converts to series 1 prostaglandins, which reduce inflammation, and are often used in eczema. However, GLA also converts to arachidonic acid, which forms inflammatory series 2 prostaglandins.<sup>9</sup> Arachidonic acid in meat fat also converts to series 2.<sup>9</sup> People with inflammatory conditions should avoid eating large amounts of

meat fat. Some omega 6 fat is essential, but it should not overshadow the omega 3. Oils should be kept refrigerated, never hydrogenated, and never fried. If they are cooked, it should only be together with water or stock.

Delta 6 desaturase is the first enzyme in the conversion from LA or ALA. This requires vitamins B1, B2 and B6, magnesium and zinc.<sup>12</sup> Vitamin B6 has to be activated to pyridoxal 5 phosphate, which involves magnesium, zinc and vitamin B2, and magnesium absorption requires vitamin B1.<sup>13</sup> Most apparent vitamin B6 deficiency is caused by a deficiency in the vitamin B2 needed to activate it.<sup>14</sup> About three quarters of British women between 19 and 50 years are deficient in magnesium.<sup>15</sup>

Evening primrose oil only bypasses the first stage in the conversion of LA to prostaglandins. Further stages require calcium, the B vitamin biotin, and vitamins B3 and C.<sup>12</sup>

### SULPHATE *See Figure 2*

Protein provides the amino acid, methionine, which then converts to homocysteine, a harmful chemical, which is often elevated in people with artery disease, cancer, rheumatoid arthritis or senility.<sup>16,17,18</sup> It is important that there is enough activated vitamin B6 to convert the homocysteine quickly to cystathionine. Cystathionine converts to cysteine, which is itself toxic to neurons. However, cysteine should be converted to glutathione, taurine or to sulphite, itself another toxic intermediate compound. Sulphite then converts to sulphate, using molybdenum and vitamin B2.<sup>19</sup> The mineral molybdenum has been found useful in treating people with arthritis of different kinds.<sup>20</sup>

Vitamin B5 is needed to make cortisol,<sup>21</sup> which increases the production of sulphate from cysteine. Any condition like rheumatoid arthritis, in which steroids are used, is a candidate for using vitamin B5, in the form of calcium or magnesium pantothenate.

Omega 3 fatty acids reduce cytokines, which inhibit conversion from cysteine to sulphate.<sup>2</sup> Fish oil thus improves the production of sulphate. Sulphate conjugates amines<sup>19</sup> like histamine, tyramine in strong cheese, and phenylethylamine in chocolate. It also conjugates phenols,<sup>19</sup> like quercetin in kale and onions, phytoestrogen in soya, and anthocyanidin in bilberry. Some people find that such foods make their rheumatoid arthritis worse. Epsom salt baths provide magnesium sulphate, which passes through the skin, and often provides relief. A cupful of Epsom salts is enough. It can be bought at garden centres.

Sulphate conjugation repairs the gut wall,<sup>22</sup> so that large peptides from dietary protein are unable to pass through. Otherwise these peptides may cause allergic reactions. The repair of the gut wall is assisted by lauric acid (12:0) and myristic acid (14:0) in coconut, butyric acid (4:0) in butter, and docosahexaenoic acid (DHA, 22:6\_3) from fish. People with rheumatoid arthritis usually have poor sulphate conjugation,<sup>23</sup> as do people with lupus, migraine, MS, ME, Parkinson's, motor neurone disease, autism and hyperactivity.<sup>19,23,24,25,26</sup> Often different members of a family conjugate with sulphate inefficiently, but the defect manifests itself in a different way in different people. Oranges, spinach and radish slow down sulphate conjugation, and should be avoided by people with rheumatoid arthritis and lupus.<sup>27</sup>

## LECTINS

Lego in Latin means I choose. Lectins are substances in seeds and tubers that choose specific sugars, and bind to them.<sup>28</sup> They affect the gut and connective tissue. Bran and whole grains and pulses contain much lectin, and need to be avoided by people with arthritis. This is a pity, because the fibre, vitamins and minerals in whole seeds are beneficial. Meat, fish, fruit and most vegetables are low in lectins. Many people with arthritis improve on a diet as near to that of the Stone Age as they can manage. It is more difficult for vegetarians, but they can reduce their lectin intake by eating split peas and lentils, macadamia nuts, cooked cashews, and white almonds, rather than whole pulses and nuts. The lentils, nuts, vegetables and fruits can provide fibre. Wheat germ lectin (wheat germ agglutinin, WGA) attaches to N-acetylglucosamine (GlcNAc or NAG).<sup>29</sup> Other lectins choose different sugars. People with rheumatoid arthritis have GlcNAc exposed at the end of the side chains of their IgG antibodies, attracting wheat germ lectin. When this has attached itself, the antibody-lectin complex may be attacked by a different antibody.<sup>30</sup> See Figure 3a, 3b

## BACTERIA

We make antibodies against bacteria. If we have the wrong genetic type, the antibodies can attack us. People with ankylosing spondylitis have increased numbers of klebsiella bacteria in the gut, whereas people with rheumatoid arthritis have increased antibodies to proteus.<sup>31,8</sup> It is important to have enough beneficial bacteria, known as probiotics, like *Lactobacillus acidophilus* and *Bifidobacterium bifidum*, to compete with pathogens in the gut. It is important to buy good quality probiotics, which can form a colony in the gut, and do not need to keep being replaced. They should be kept refrigerated, except when in transit.

## METHYLATION

Methylation is relevant to inflammatory conditions, as it reduces histamine levels. Folic acid holds methyl groups until they are needed, and works with vitamin B12 in methylation.<sup>16</sup> Magnesium is part of the enzyme that transfers methyl groups to histamine.<sup>32</sup> People with poor methylation often have high levels of the harmful chemical, homocysteine, in their blood. They need nutritional supplements to rectify this.

## DIET AND SUPPLEMENTS FOR ARTHRITIS

People with arthritis should have plenty of fish or flax, and generous amounts of vegetables. They may also have some lean meat, some fruit, split pulses without skins, macadamia nuts, roast cashews, and white almonds, white rice, tapioca and sago.

Double blind trials have shown that ingestion of foods to which a person is sensitive can trigger worsening of arthritis.<sup>8</sup> Such trigger foods may include milk, cheese, grains, coffee, fruits with pips, tomatoes and peppers.<sup>8</sup> Food sensitivity is a factor in both rheumatoid arthritis and osteoarthritis.<sup>5</sup> People with osteoarthritis, or those with aching knees or restless legs, may lack the manganese needed for cartilage.<sup>33</sup>

Supplements for arthritis could include clean oil from the flesh of the fish, high dose, carefully produced *Lactobacillus acidophilus* and *Bifidobacteria*, a balanced multivitamin tablet, balanced minerals, particularly molybdenum, magnesium and, manganese, and perhaps some capsules of N-acetylglucosamine. The minerals should be in a well absorbed form, for example as amino acid chelate. Diets rich in essential fatty acids need extra vitamin E, to protect against free radical damage.<sup>7</sup> Free radical damage is thought to be involved in rheumatoid arthritis.<sup>34</sup>

Nutrients are designed to work as a team. Do not give one nutrient on its own.

## COUNSELLING

We should take time to listen to our patients' woes, and comfort them. They need to know that improvement may take time. Emphasise the foods that they may eat, and not only those you wish them to avoid. Help them with simple recipes, attractively presented. Encourage them to eat omega 3 fats and vegetables, have Epsom salt baths, limit their intake of lectins, take helpful bacteria and all the vitamins and minerals.

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Figure 3a. A Lectin Binds to a Side-chain of a Rheumatoid IgG Antibody

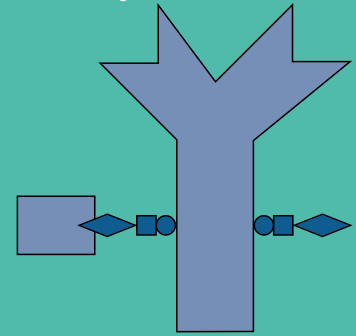


Figure 3b. The Lectin Cannot Bind to a Side-chain of a Normal IgG Antibody

