



# Omega-3 Fatty Acids

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Literature Education Series On Dietary Supplements

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Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are omega 3 fatty acids (O3FA). O3FA supplements are mostly derived from coldwater species of fish like salmon, sardines, herring, and mackerel; as well as from a few vegetarian sources, such as flax seed oil. There are many therapeutic applications for O3FA, primarily due to its cardiovascular-enhancing and anti-inflammatory benefits. Research has shown that O3FA cardiovascular benefits include reducing the risk of atherosclerosis, modifying cholesterol levels (i.e., increasing “good” HDL cholesterol, while decreasing “bad” LDL cholesterol), decreasing triglycerides, and decreasing high blood pressure. O3FA have also been shown to block the production of certain inflammatory chemicals in our body. Consequently, studies have demonstrated the ability of O3FA to reduce inflammation in such disorders as rheumatoid arthritis, asthma, colitis, Crohn’s disease, and Lupus. In addition, O3FA have shown to reduce the symptoms of other disorders including angina, migraine headaches, psoriasis, and tinnitus.

Most fish oil supplements come in a mixture of 18% EPA and 12% DHA. Therefore, in 1000 mg of fish oil there would be 180 mg EPA and 120 mg of DHA. However, it makes more sense

to seek out more concentrated preparations, which will minimize the amount of fish oil you must consume, and help prevent the dreaded fish burp. Look for something in the 375 mg EPA and 250 mg DHA range, providing 625 mg of total omega 3 fatty acids. The doses recommended in the following conditions are based on the use of a supplement providing 625 mg of total omega 3 fatty acids.

People who take O3FA may also need to take vitamin E to protect the oil from oxidative damage in the body.<sup>1</sup> The vitamin E can be included in with the O3FA, or as a separate supplement.

## **Atherosclerosis**

There is so much research supporting supplementation with O3FA in atherosclerosis, that it is unnecessary to go beyond research conducted in just the last few years to make the case. These studies have clearly shown that O3FA can reduce risk factors for atherosclerosis,<sup>2,3</sup> as well as slowing the progression of the disease itself.<sup>4,5</sup> As a matter of fact, The Physicians Health Study (22,071 doctors) suggests that fish oils can reduce a man’s risk of dying from a heart attack by 80%.<sup>6</sup> Likewise, the Nurses Health Study (84,688 female nurses), found that O3FA can cut a woman’s risk of death by heart attack by 33%.<sup>7</sup>

One mechanism by which O3FA works is via its effects on cholesterol. Another mechanism is that O3FA are actually able to lower levels of certain genetically-predisposed substances which are relevant to atherosclerosis.<sup>8</sup> Still another related benefit is that O3FA were found to reduce the potential for blood clots in atherosclerosis patients.<sup>9</sup> An effective dose would be 1-3 capsules daily.

## Cholesterol & triglycerides

Including fish as a regular part of the diet has been shown to increase HDL cholesterol<sup>10</sup> and is linked to a reduced risk of heart disease in the majority of studies<sup>11</sup> Besides the fact that fish contains very little saturated fat, one reason that it has this effect is its oils contain the O3FA that appear to protect against heart disease.<sup>12</sup> Of course O3FA are available in supplemental form, and research has shown that supplementation with O3FA lowers total cholesterol, LDL cholesterol (the “bad” cholesterol), and triglycerides, while increasing HDL cholesterol (the “good” cholesterol).<sup>13 14</sup> An effective dose would be 5 capsules daily.

## High blood pressure

According to a meta-analysis of thirty-one studies, the O3FA found in fish oils effectively lower blood pressure.<sup>15</sup> This effect was dependent on the amount of omega 3 fatty acids used, with best results occurring in those studies using very high doses— 15 grams daily. To obtain 15 grams of the omega 3 fatty acid would generally require consuming an enormous number of capsules! Such huge doses would not be a reasonable addition to a dietary supplement program for most people. Another possibility is to use the higher potency O3FA discussed earlier; then you could get the 3 grams by taking 5 capsules daily. Research has shown that significant reductions in blood pressure occurred at these lower intakes, just not as impressive as with the higher doses.

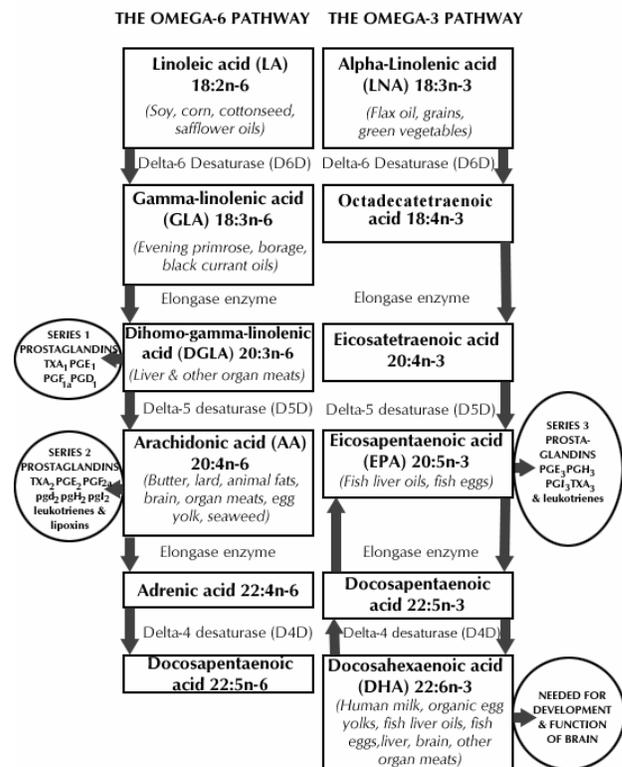
## Understanding inflammation and O3FA

To understand why O3FA have anti-inflammatory benefits, you must first understand how inflammation works. Many factors contribute to the complex course of inflammatory reactions (see chart). One important contributing factor is the fatty acid, arachidonic acid (AA). AA can be converted via an enzymatic process into pro-inflammatory substances, especially one called prostaglandin 2 (PG2). In states of inflammation, it seems that O3FA is able to compete with AA for enzymatic metabolism, which results in less production of less inflammatory PG2.

## Rheumatoid arthritis

Well-controlled clinical studies have clearly demonstrated that consumption of O3FA has

resulted in an improvement in rheumatoid arthritis (RA) sufferers.<sup>16</sup> As a matter of fact, a comprehensive review of medical literature by a board certified rheumatologist revealed that treatment with O3FA is associated with improvement in outcome measures in RA, and is able to help decrease the long-term requirements for nonsteroidal anti-inflammatory drugs (e.g., aspirin, ibuprofen) in some circumstances.<sup>17</sup> Furthermore, an expert workshop reviewing the health effects of O3FA also concluded that these natural substances were able to help alleviate the symptoms of RA.<sup>18</sup> It should be noted that these O3FA-related benefits were not limited to adult RA sufferers. A study conducted in the Czech Republic found that children with chronic juvenile arthritis were able to decrease their ibuprofen consumption by 17.3% over a period of five months when treated with a high-O3FA diet.<sup>19</sup> An effective dose would be 1-2 capsules daily.



## Asthma

The same inflammatory mechanism previously described holds true for the inflammatory process involved in asthma, and the beneficial role of O3FA in treating this disorder. This was demonstrated in a clinical trial where O3FA significantly decreased bronchial hyper-reactivity in patients suffering from seasonal

asthma due to airborne allergens.<sup>20</sup> Similar research with O3FA in asthma has also shown a reduction of symptoms.<sup>21 22 23</sup> An effective dose would be 1-2 capsules daily.

### **Colitis**

There is a significant amount of research documenting the effectiveness of O3FA in the treatment of colitis. For example, in two randomized, double-blind, placebo-controlled, crossover trials, O3FA resulted in significant improvements in colitis patients; including the ability to reduce or eliminate anti-inflammatory drugs in those them concurrently.<sup>24 25</sup> Other studies have shown similar beneficial results in colitis with O3FA treatment.<sup>26 27 28</sup> An effective dose would be 1-2 capsules daily.

### **Crohn's disease**

Significantly lower levels of the O3FA have been in Crohn's disease patients.<sup>29</sup> Other research has suggested that a reduction in omega 3 fatty acids may be relevant to the activity of the disease.<sup>30</sup> In fact, in animal research, supplementation with O3FA markedly reduced bowel lesions after 30 days, and inflammation and ulceration in the bowel were almost absent by day 50.<sup>31</sup> An effective dose would be 1-2 capsules daily.

### **Lupus**

Supplementation with O3FA has prevented autoimmune lupus in animal research.<sup>32</sup> In a double blind study, 20 grams of fish oil daily combined with a low-fat diet led to improvement in fourteen of seventeen people with systemic lupus erythematosus in twelve weeks.<sup>33</sup> Smaller amounts of fish oil have led to only temporary improvement in other double blind research.<sup>34</sup> If the higher potency fish oil supplement is used, then the 20 gram dose could be halved to 10 grams. This would still require, however, the consumption of 15-18 capsules daily. People wishing to take such a large amount of fish oil should first consult with a nutritionally oriented doctor. An effective dose would be 5-6 capsules, three times daily.

### **Angina**

O3FA have been studied in the treatment of angina. Some research indicates that 3 grams or more of O3FA three times per day (providing a total of about 3 grams of EPA and 2 grams of DHA) have reduced chest pain as well as the

need for nitroglycerin, a common medication used to treat angina.<sup>35</sup> However, other research did not confirm these benefits.<sup>36</sup> Based upon the research showing results, an effective dose would be 8 capsules daily. However, people wishing to take this high dose should first consult with a nutritionally oriented physician.

### **Migraine**

Research indicates that O3FA, may reduce the symptoms of migraine headaches.<sup>37 38</sup> The omega-3 fatty acids in fish oil may help due to its effects in modifying prostaglandins,<sup>39</sup> hormone-like substances made by the body, and/or due to its platelet-stabilizing and antivasospastic actions.<sup>40</sup> One study used 1 gram of fish oil per 10 pounds of body weight. Of course this would be a tremendous amount of fish oil capsules to consume. Even if the higher potency omega 3 supplement were used, the number of capsules consumed at this rate may be prohibitive. Some researchers have suggested that heart disease patients could benefit from low dose (1-6 grams daily day) of fish oils.<sup>39</sup> A similar benefit might be achieved by migraine patients with low dose fish oils. An effective dose would be 2-10 capsules daily. However, people wishing to take the higher end of this dose should first consult with a nutritionally oriented physician.

### **Psoriasis**

In a double blind study, fish oil (10 grams per day) was found to improve the skin lesions of psoriasis.<sup>41</sup> In another study, supplementing with 3.6 grams per day of the purified omega 3 fatty acid, eicosapentaenoic acid (EPA, one of the fatty acids found in fish oil) reduced the severity of psoriasis after two to three months.<sup>42 43</sup> That amount of EPA is contained in about 20 grams of fish oil. If the higher potency fish oil supplement is used, the dose could be halved: from 10 grams to 5, or from 20 grams to 10. This would still require the daily consumption of 8-9 capsules or 15-18 capsules, respectively. People wishing to take the 15-18 capsule dose should first consult with a nutritionally oriented doctor. Another consideration is topical use. One study showed that applying a preparation containing 10% fish oil directly to psoriatic lesions twice daily resulted in improvement after seven weeks.<sup>44</sup> Supplementing with fish oil also may help prevent the increase in blood levels of triglycerides that occurs as a side effect of

certain drugs used to treat psoriasis (e.g., etretinate and acitretin).<sup>45</sup> An effective dose for this purpose would be 8-9 capsules daily (which would also require consultation with a nutritionally oriented physician).

### Tinnitus

In 1980, research published in an British medical journal suggested that certain “baropathic” disorders, including tinnitus, may be related to prostaglandin disturbances induced by primary or secondary essential fatty acid deficiencies. Subsequent research published in an American journal discussed the relationship between O3FA supplements, and amelioration of certain mental disorders which included tinnitus as a symptom.<sup>46 47</sup> An effective dose would be 1-2 capsules daily.

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