



## FISH OMEGA-3S AND THE IMMUNE SYSTEM — EASING ITCHES, SNEEZES AND PAIN

The immune system protects the body from foreign invaders such as bacteria, viruses and allergens by producing specific antibodies for each invader. Once an antibody latches on to the intruder, it becomes marked for destruction and removal by other immune cells. Another part of the immune system removes infected cells and generates inflammation—the swelling, pain, heat, redness and sometimes itching—that develops around an insect bite, wound, or the body's own tissue (e.g., rheumatoid arthritis). Inflammatory responses promote healing and limit tissue damage from an injury or harmful agent.

Excessive immune responses pave the way to several chronic diseases, such as diabetes, cardiovascular disease, rheumatoid arthritis, and multiple sclerosis. They underlie allergies or hypersensitivity to a foreign antigen, such as pollen or certain food proteins. Allergies include inflammatory responses in skin, nose and eyes and result in the joint pain of rheumatoid arthritis, the breathing difficulties of asthma, and the itchy red skin of psoriasis and eczema.

Polyunsaturated fatty acids greatly affect inflammatory responses because of substances made from them. Arachidonic acid, derived from vegetable oils, increases inflammatory responses. In contrast, the omega-3 fatty acids from fish and shellfish, EPA\* and DHA,\* help restrain runaway inflammation. EPA competes with arachidonic acid, reducing the amount of inflammatory products made. EPA is itself converted to compounds that are weakly anti-inflammatory, further reducing the symptoms of inflammation.

Allergic diseases are increasing in western countries. It is possible that declining consumption of omega-3s and antioxidants (e.g., vitamins E and C), along with the high intake of omega-6 fatty acids† from vegetable oils favor the development of allergies such as eczema, asthma and hayfever. Reduction in total fat consumption and increased intake of omega-3s are associated with improved immune function and less severe symptoms in some people with these conditions.

### Rheumatoid Arthritis

In rheumatoid arthritis the body's immune system targets the joints causing pain, stiffness, swelling and deformity. It is three times more common in women than men. Fish oil has been used to treat rheumatoid arthritis for many years and has helped ease the symptoms of morning stiffness, pain, and swollen joints. Fish oil also reduces the production of inflammatory substances and reduces the activity of enzymes that erode joint tissue. However, it can take from 6 to 12 weeks before any improvements are noticed. It also requires fairly hefty doses, in the range of 4 grams of omega-3s (EPA and DHA) or more per day. This amount is more than can be obtained from foods alone and usually requires the consumption of 10 or more capsules daily, or taking fish oil in liquid form.

Adding fish oil to other arthritis medications has additional advantages. It reduces the amount of non-steroidal anti-inflammatory drugs needed and has many protective effects on heart health. It is also without harmful side effects. Before taking large amounts of fish oil, people should consult with their doctor, especially if they are taking blood-thinning medications.

### Asthma

Asthma results from chronic inflammation of the airways. The condition affects about 16 million American adults, but often begins in childhood. People with asthma have episodes of breathing difficulty, wheezing, breathlessness, chest tightness and coughing. Breathing problems can be triggered by allergens, irritating substances in the air (e.g., smoke), infection and exercise.

Although there are many studies of the effects of fish oil in people with asthma, findings are mixed and inconclusive. Many studies found little benefit from moderately high amounts of omega-3s. However, several epidemiological studies (observations comparing the condition in one group with another) indicate that low omega-3 intake and levels in

\* EPA or eicosapentaenoic acid; DHA or docosahexaenoic acid

† Omega-6 fatty acids are polyunsaturates with a slightly different structure from omega-3s

blood are linked to greater occurrence of asthma. In addition, foods consumed in most western countries, particularly in the U.S., are high in the fatty acids that promote inflammatory responses (polyunsaturated vegetable oils) and very low in omega-3s.

Several studies with fish oil supplementation reported that inflammatory substances were significantly reduced, even if symptoms were unaffected. More recent research in asthmatic patients undergoing exercise reported that the consumption of fish oil for 3 weeks prior to exercise significantly improved lung function, reduced the use of a bronchodilator (inhaler), and decreased the production of inflammatory substances.

Several studies in children at risk of asthma suggest that consuming fish in early childhood may reduce the chance of developing the condition, delay it, or result in less severe symptoms. Children with higher intakes of seafood omega-3s have less wheeze and cough compared with children with low levels. Omega-3s do not prevent the condition, but help make it less severe.

### Eczema

Another allergic inflammatory condition is eczema, a chronic skin disease, often linked to family history. Some forms of eczema, usually in patients with a family history of eczema, have altered polyunsaturated fatty acid metabolism that results in lower production of anti-inflammatory substances. In several studies, fish consumption or supplementation with EPA and DHA resulted in less severe symptoms in people with the condition. Fish oils reduced the production of inflammatory substances and increased those with anti-inflammatory effects. There are also reports of less severe allergies in infants and children whose mothers consumed fish oil during pregnancy. However, fish oils do not prevent eczema.

Much remains to be learned about these complex immune conditions. However, regular fish consumption or omega-3 supplementation may offer some relief to those suffering from them.

[ Written by Joyce A. Nettleton, DSc, RD, ScienceVoice Consulting, Denver, CO ]  
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[www.alaskaseafood.org](http://www.alaskaseafood.org)

Administrative Office (800) 478-2903

311 N. Franklin, Suite 200, Juneau AK 99801-1147

Marketing Office (800) 806-2497

150 Nickerson Street, Suite 310, Seattle WA 98109