

The Beneficial Effect of Omega-3 Fatty Acids on the Prevention of Autoimmune Diseases

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ABSTRACT

A quarter of a million people in America are diagnosed with an autoimmune disease each year. These diseases can be serious and debilitating. A review of the scientific literature was performed to investigate the link between omega-3 fatty acids and autoimmune disorders. A strong beneficial effect was found in studies that used mouse models of autoimmune disorders. Mice given fish oil or individual dietary omega-3 fatty acids experienced a decrease in symptoms. Human studies show less dramatic results but a clear anti-inflammatory response is seen. Possible prevention of relapse occurs in some diseases. A reduced risk for developing autoimmune disorders has also been found.

INTRODUCTION

Autoimmune diseases are quite varied. They can range from minor annoyances to fatal diseases. Cures are virtually non-existent. Not much is known about why they occur. There are more than 80 diseases caused by auto-immunity and a quarter of a million people in America are diagnosed with one of those diseases each year. Autoimmune disease especially affect women. (1)

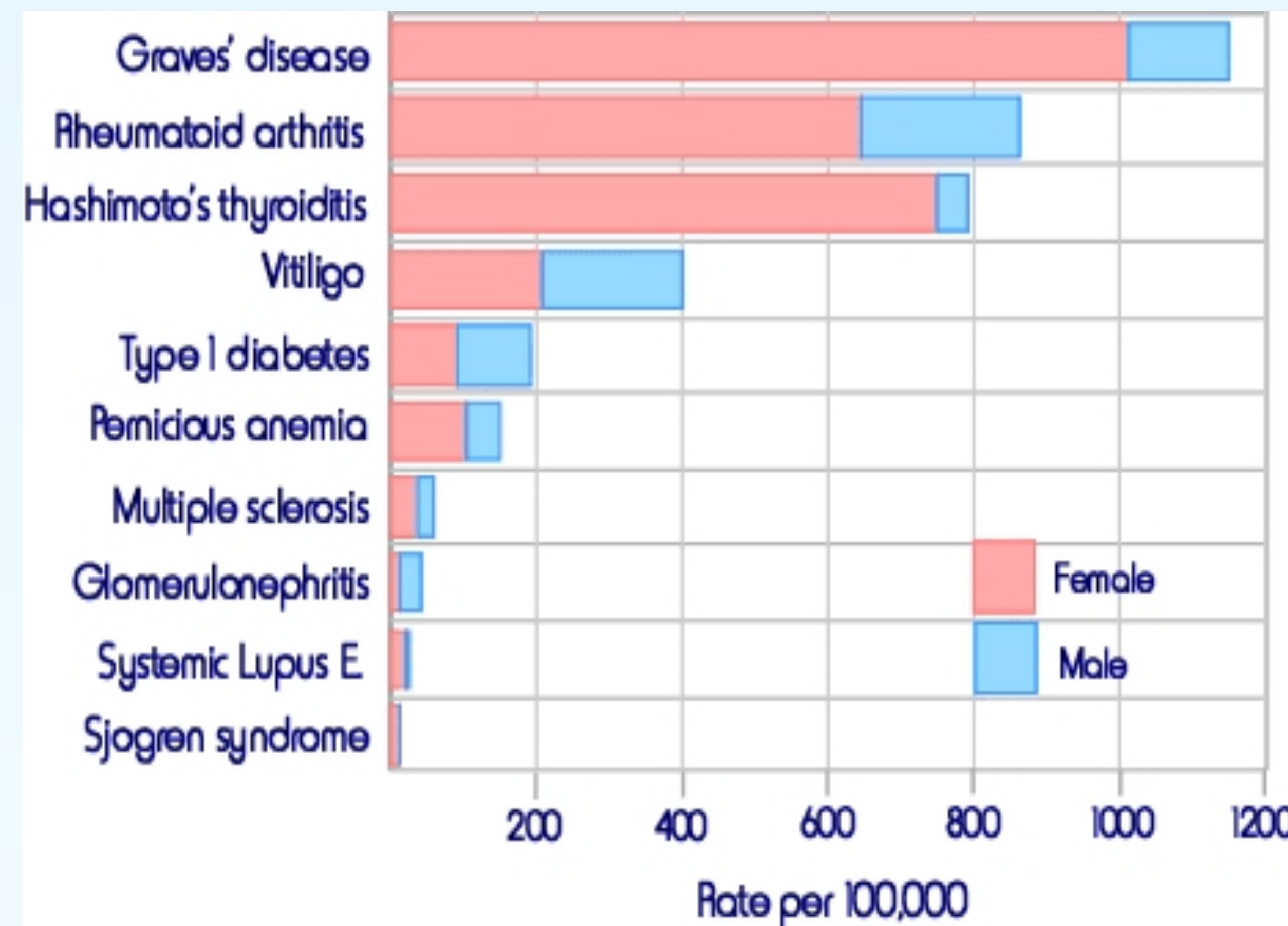


Table 1: Frequency of Major Autoimmune Diseases (1)

Table 2: Cause of Major Autoimmune Diseases (2, 3)

Autoimmune Disease	Cause
Grave's Disease	auto-antibodies attach to the thyroid gland and produce an increase in the thyroid hormone
Rheumatoid Arthritis	autoimmune attack on the tissue that lines the joints causes thickening and inflammation
Hashimoto's Thyroiditis	an autoimmune reaction to proteins in the thyroid gland creates a lack of thyroid hormone
Vitiligo	autoimmune reaction causes destruction of melanocytes (pigment cells) and causes decreased pigmentation of the skin
Type 1 Diabetes	immune mediated diabetes is the most common form of Type 1 Diabetes and occurs when the immune system attempts to destroy the cells in the pancreas that produce insulin
Pernicious Anemia	an autoimmune gastritis causes an inflammation of the mucosal lining of the stomach
Multiple Sclerosis	autoimmunity causes destruction of nerves' myelin sheath
Glomerulonephritis	autoimmunity causes inflammation of glomeruli (internal kidney structures)
Systematic Lupus Erythematosus	immune system attacks otherwise healthy organs and systems like joints, kidneys, brain, heart and lungs
Sjogren syndrome	autoantibodies attack the tear, salivary, and other moisture-producing glands

METHOD

A review of autoimmune disease and the effects of omega-3 fatty acids on inflammation and autoimmune diseases in peer reviewed literature and general medical literature was done to compile the information on this poster.

RESULTS/DISCUSSION

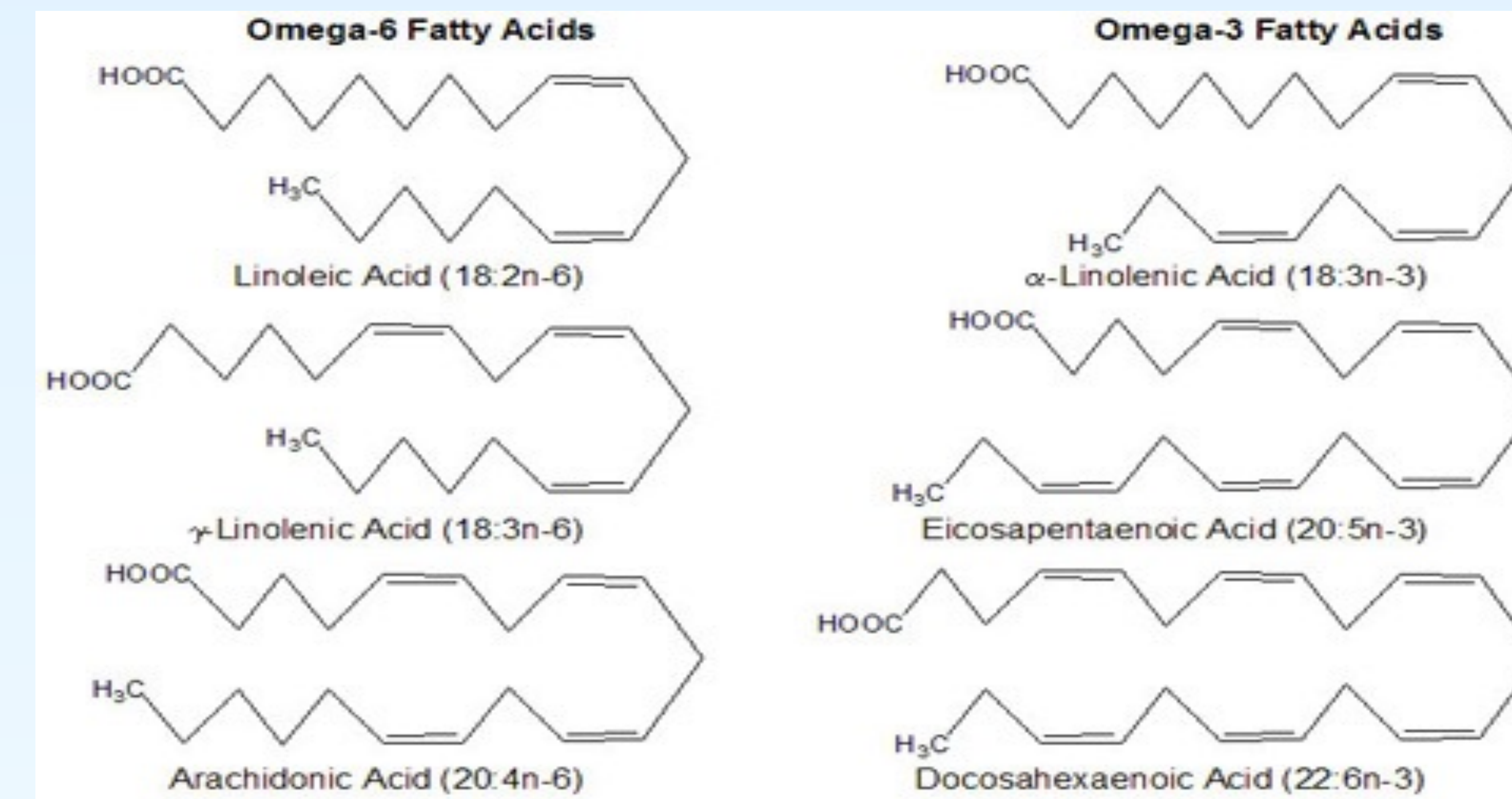


Table 3: In the human diet, omega 3 fatty acids reduce Inflammation (immune response), while omega-6 Promotes inflammation (8)

Studies using animal models of autoimmune diseases show that animals with diets high in omega-3 fatty acids are more likely to live longer and have less severe symptoms from autoimmune diseases, while animals with diets high in omega-6 fatty acids have more severe symptoms. (4) One study found that mice with a model of human rheumatoid arthritis who were fed fish oil experienced significantly less bone mineral density loss than mice who were fed corn oil, which is an omega-6 fatty acid. Loss of bone mineral density is a frequent symptom of rheumatoid arthritis. (5)

The effects of omega-3 fatty acids like fish oil in humans is more complicated to sort out than when dealing with animal models. Many studies that show significant benefits of fish oil used in very high doses that may not be transferrable to humans. Fish oils has shown a mild effect in diseases like rheumatoid arthritis and Crohn's disease, but some studies showed that it could prevent relapse. In diseases where the inflammation tends to be more mild fish oil may prevent or slow the disease. It is unclear whether individuals who already have a disease actually benefit in the long term from consumption of fish oil, but as a preventative measure it seems to be effective. (4)

Omega-6 fatty acids seem to have the opposite effect of omega-3 fatty acids. One group of studies show that omega-6 could increase autoimmune disease by decreasing antioxidant enzyme mRNA levels and increasing free radical formation which harms immune function. The same studies show that omega-3 does the opposite and protects against autoimmunity. (6)

While all this is important and interesting, it is not entirely as black and white as omega-3 is good, omega-6 is bad. Both kinds of fats have an obvious effect on inflammation and autoimmune diseases, and while omega-6 has been shown to be harmful in some instances, it can also be useful as well. For instance, in experiments looking at T cell-mediated autoimmune disease omega-6 fatty acids seem to reduce the severity or even prevent disease while diets supplemented with omega-3 augmented the disease. (7) Both types of fatty acid, especially omega-3, can be beneficial in preventing and perhaps in treating autoimmune diseases, but more research is necessary to determine exactly how each affect the human body and what benefits they have in regards to autoimmune diseases, especially in the long term.

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