Reference:

Docosahexaenoic Acid in the Treatment of Rheumatoid Arthritis: A Double-blind, Placebo-controlled, Randomized, Cross-over Study with Microalgae vs. Sunflower Oil

Dawczynskia, K. C. et al., Clinical Nutrition, in press, 2017

Summary:

The potential for supplemental EPA plus DHA omega-3 fatty acids (in combination) as derived from fish oil for alleviating the varying symptomology of rheumatoid arthritis has been indicated in multiple clinical trials. However, little information is available on the effect of the individual long-chain omega-3 fatty acids (EPA or DHA alone) in this regard. In this double-blinded study, 38 patients with an average age of 61 years (19 in each of two groups at entry) confirmed to have rheumatoid arthritis (RA) were assigned to consume foods which were either enriched with a microalgae oil providing 2.1 grams DHA/day or sunflower oil (control oil devoid of DHA) for 10 weeks after which they entered into the 10 week ‘washout period followed by another 10-week assignment to the alternate oil. Disease activity was clinically measured at entry and at 10, 20, and 30 weeks. Blood levels of DHA and the capacity of the blood to form pro-inflammatory products from AA (arachidonic acid omega-6) were also measured.

Ten weeks of DHA supplementation resulted in a statistically-significant reduction in the number of swollen joints (by 28 % overall) and in the sum of tender plus swollen joints (by 29 % overall) as well as a reduction (by 39 % overall) in ultrasound assessment (in power Doppler mode) of tenosynovitis grade (inflammation of the fluid-filled sheath surrounding a tendon). No such significant reductions were found with the control oil devoid of DHA. DHA levels in the red blood cells doubled with DHA supplementation with no significant change being seen with the control oil. The capacity of the blood to convert AA to the pro-inflammatory 5-lipoxygenase product (5-hydroxyeicosatetraenoic acid) was significantly reduced via supplemental DHA while levels of the precursors (14-HDoHE/17-HDoHE) to the formation of resolvin/protectin/marensin (which antagonize inflammation and promote resolution) increased. The authors concluded that supplemental DHA from an algal source can improve disease activity in patients with RA and shift the balance of AA- and DHA- derived bioactive products towards an anti-inflammatory and pro-resolving state.
Dr. Holub’s Comments:

A recent systematic review and meta-analysis (Gioxari, A. et al., Nutrition, in press (2017)) has confirmed the results from previous meta-analysis which support the beneficial effect of long-chain omega-3 fatty acids from fish oil (EPA plus DHA) in significantly improving various markers of disease activity. The present study which employed DHA from an algal source would appear to offer an alternative option which might be of interest to those (eg., vegans or others) who might be adverse to fish oil sources for whatever reason(s). The authors employed a daily DHA intake of 2.1 grams (2100 mg) daily which is much above typical daily intakes from mixed diets (of approx. 80 mg/day in North America) but yet well within levels that are considered to be generally safe. The resulting shift in metabolic balance towards an anti-inflammatory and pro-resolving state with DHA supplementation was considered to mediate the favourable effect on disease activity. It is noted that DHA supplementation (free of EPA) was found to elevate both EPA as well as DHA levels in the circulation as reported from our lab previously via retro-conversion (Conquer and Holub, J. Nutr., 126: 3032-3039 (1996)). Thus, a portion of the beneficial impact of DHA supplementation may be mediated via the conversion of the resulting EPA to E-series resolvins.