Incorporation of n-3 LC-PUFA and GLA in plasma lipids, cholesterol esters, an erythrocyte membranes and their influence on disease activity of rheumatoid arthritis

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Aim: Long-chain n-3 polyunsaturated fatty acids (n-3 LC-PUFA) act beneficial in the management of inflammatory diseases, e.g., rheumatoid arthritis (RA). Some studies show beneficial effects for ¥ã-linolenic acid (GLA). In our study, the effects of n-3 LCPUFA and GLA alone or a combination of n-3 LC-PUFA and GLA in comparison with olive oil as control were tested. The incorporation of these FA in plasma lipids (PL), cholesterol esters (CE), and erythrocyte membranes (EM) were compared with the effects on disease activity measured by disease activity score DAS28.

Design: Fifty four patients with RA (49 f, 5 m), and six patients with psoriasis arthritis (4 f, 2 m) were randomly divided into four groups in a double-blind, placebo-controlled parallel designed study. The patients received the respective capsules (A: 3 g n-3 LCPUFA/ d; B: 3 g GLA/d; C: 1.6 g n-3 LC-PUFA + 1.8 g GLA/d; D: 3 g olive oil) for twelve weeks. Blood samples and the DAS28 were taken at the beginning and at the end of the period.

Results: Due to the consumption of n-3 LC-PUFA (group 1), the supplemented FA increased significantly in PL, CE, and EM, whereas the concentration of arachidonic acid (AA) decreased significantly in EM. The highest decrease of AA/eicosapentaenoic acid (EPA) ratio was shown in EM (from 25.1 ¡¾ 10.1 to 7.2 ¡¾ 4.7; p ¡Â 0.01). The consumption of GLA in group 2 caused a significant increase of GLA and dihomo-¥ã-linolenic acid (DGLA) in CE and EM. The increase of n-3 LC-PUFA and GLA in group 1 and 2 depended on the supplemented dosage because it was lower in group 3. In the placebo group, the FA distribution was not affected.