

# Resolvins in Alzheimer disease patients supplemented with omega-3 fatty acids

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The neuropathology of Alzheimer disease is related to brain amyloidosis with amyloid-beta 1-42. Macrophages, the innate immune cells responsible for amyloid-beta clearance in the brain, are defective in amyloid-beta phagocytosis and degradation in patients with Alzheimer disease. Resolvin D1 (in concentration dependent fashion 0.26 nM to 260nM) increased amyloid-beta phagocytosis by macrophages of Alzheimer disease patients. In addition, resolvin D1 treatment of peripheral blood mononuclear cells (PBMCs) normalized the transcription of interleukin-1 (IL-1) alpha and beta according to the basal state: down regulated IL-1 in Alzheimer patients with inflammatory PBMCs and up regulated IL-1 in patients with non-inflammatory PBMCs. In addition resolvin D1 differentially down regulated certain chemokines. We are conducting a nutritional study of 10 Alzheimer disease patients receiving supplementation with omega-3 drink (containing 1 gm of DHA and 1 gm of EPA) and are testing macrophages and PBMCs of these patients and controls regarding production of resolvin D1 and transcriptional regulation. The results show that in vivo supplementation with DHA is increasing production of resolvin D1 and modulates transcription of inflammatory genes. Thus, nutritional supplementation with omega-3 has profound biochemical and immune effects possibly related to resolvins in PBMCs of Alzheimer disease patients.