

Abstract

Inflammation (IL-1 β) Modifies the Effect of Vitamin D and Omega-3 Long Chain Polyunsaturated Fatty Acids on Core Symptoms of Autism Spectrum Disorder [†]

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Background: Vitamin D and omega-3 long chain polyunsaturated fatty acids (omega-3 LCPUFA) may improve core symptoms of Autism Spectrum Disorder (ASD) in children, but the response is heterogenous and may be influenced by inflammatory state. As an exploratory analysis, we investigated whether inflammatory state would modulate the effect of these nutrients on core symptoms of ASD.

Methods: Seventy-three New Zealand children with ASD (2.5–8.0 years) completed a 12-month randomised, double-blind, placebo-controlled trial of vitamin D (2000, IU/day, VID), omega-3 LCPUFA; (OM, 722 mg/day docosahexaenoic acid), or both (VIDOM). Non-fasting baseline plasma interleukin-1 β (IL-1 β) was available for 67 children (VID = 15, OM = 21, VIDOM = 15, placebo = 16). Children were categorised as having undetectable/normal IL-1 β (<3.2 pg/mL, n = 15) or elevated IL-1 β (\geq 3.2 pg/mL, n = 52). Social Responsiveness Scale questionnaire (SRS) was used to assess core symptoms of ASD (baseline, 12-month). Mixed model repeated measure analyses (including all children or only children with elevated IL-1 β) were used.

Results: We found a significant, or a trend for, an interaction between baseline IL-1 β and treatment response for SRS-total ($P = 0.06$), SRS-social communicative functioning ($P = 0.04$), SRS-awareness ($P = 0.006$) and SRS-communication ($P = 0.09$). When all children were included in the analysis, four outcome measures comparisons (treatments vs. placebo) showed potential

improvements: VID, no effect (all $P > 0.10$); OM ($P = 0.06$) for SRS-total; VIDOM ($P = 0.05$) for SRS-social communicative functioning; OM and VIDOM ($P = 0.01$) for SRS-awareness. When only children with elevated IL-1 β were included, 10 outcomes showed potential improvements: VID ($P = 0.07$) and OM ($P = 0.01$) for SRS-total; VID ($P = 0.09$), OM ($P = 0.03$) and VIDOM ($P = 0.05$) for SRS-social communicative functioning; VID ($P = 0.01$), OM ($P = 0.003$) and VIDOM ($P = 0.01$) for SRS-awareness; VID for SRS-communication ($P = 0.07$); OM ($P = 0.05$) for SRS-motivation.

Conclusion: Inflammatory state may have modulated responses to vitamin D and omega-3 LCPUFA intervention in children with ASD, suggesting children with elevated inflammation may benefit more from daily vitamin D and omega-3 LCPUFA supplementation.



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