

Alpha-linolenic Acid exerts less Pro-inflammatory effects Compared to EPA in ex vivo PBMCs

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Background: Peripheral blood mononuclear cells (PBMCs) are the only readily available cells in healthy humans and are central in inflammation. Fatty acids have different immunomodulating effects depending on the chain length and the degree of saturation. Little is known about how polyunsaturated fatty acids (PUFAs) activation of PBMCs enables them to alter the expression and release of cytokines and thereby the inflammatory process.

Objective: The objective of the study was to investigate the effects of linolic acid (LA), alpha-linolenic acid (ALA) and eicosapentanoic acid (EPA) on the protein release and mRNA gene expression of inflammatory markers in PBMCs ex vivo isolated from healthy adults.

Design: PBMCs were incubated ex vivo with 60 uM LA, ALA or EPA for 24 hours. Protein release and mRNA gene expression of IL-8, IL-6, IL-1 β and TNF α cytokines were measured using multiplexable suspension arrays and quantitative real-time PCR amplification.

Results: Incubation with LA and EPA resulted in increased protein release of IL-6, IL-8, IL-1 β and TNF α with the most prominent effect observed for EPA. ALA had little or no effect. The mRNA gene expression levels were also increased by EPA.

Conclusion: The omega-3 (n-3) fatty acids ALA and EPA elicit different effects on cytokine release and gene expression in PBMCs. EPA is having the most prominent pro-inflammatory potential, while ALA seems to be neutral.