Gamma linolenic acid: an antiinflammatory omega-6 fatty acid.


Source

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Abstract

Inflammation plays an important role in health and disease. Most of the chronic diseases of modern society, including cancer, diabetes, heart disease, arthritis, Alzheimer's disease, etc. have inflammatory component. At the same time, the link between diet and disease is also being recognized. Amongst dietary constituents, fat has gained most recognition in affecting health. Saturated and trans fatty acids have been implicated in obesity, heart disease, diabetes and cancer while polyunsaturated fatty acids (PUFAs) generally have a positive effect on health. The PUFAs of omega-3 and omega-6 series play a significant role in health and disease by generating potent modulatory molecules for inflammatory responses, including eicosanoids (prostaglandins, and leukotrienes), and cytokines (interleukins) and affecting the gene expression of various bioactive molecules. Gamma linolenic acid (GLA, all cis 6, 9, 12-Octadecatrienoic acid, C18:3, n-6), is produced in the body from linoleic acid (all cis 6,9-octadecadienoic acid), an essential fatty acid of omega-6 series by the enzyme delta-6-desaturase. Preformed GLA is present in trace amounts in green leafy vegetables and in nuts. The most significant source of GLA for infants is breast milk. GLA is further metabolized to dihomogamma linolenic acid (DGLA) which undergoes oxidative metabolism by cyclooxygenases and lipoxygenases to produce anti-inflammatory eicosanoids (prostaglandins of series 1 and leukotrienes of series 3). GLA and its metabolites also affect expression of various genes where by regulating the levels of gene products including matrix proteins. These gene products play a significant role in immune functions and also in cell death (apoptosis). The present review will emphasize the role of GLA in modulating inflammatory response, and hence its potential applications as an anti-inflammatory nutrient or adjuvant.

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