

## **Dietary omega-3 PUFA and health: stearidonic acid-containing seed oils as effective and sustainable alternatives to traditional marine oils.**

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### **Abstract**

The daily consumption of dietary omega-3 PUFA is recommended by governmental agencies in several countries and by a number of health organizations. The molecular mechanisms by which these dietary PUFA affect health involve the enrichment of cellular membranes with long-chain 20- and 22-carbon omega-3 PUFA that impacts tissues by altering membrane protein functions, cell signaling, and gene expression profiles. These changes are recognized to have health benefits in humans, especially relating to cardiovascular outcomes. Cellular membrane enrichment and health benefits are associated with the consumption of long-chain omega-3 PUFA found in marine oils, but are not generally linked with the consumption of alpha-linolenic acid, the 18-carbon omega-3 PUFA found in plant seed oils. However, the supply of omega-3 PUFA from marine sources is limited and may not be sustainable. New plant-derived sources of omega-3 PUFA like stearidonic acid-soy oil from genetically modified soybeans and Ahiflower oil from *Buglossoides arvensis* seeds that are enriched in the 18-carbon omega-3 PUFA stearidonic acid are being developed and show promise to become effective as well as sustainable sources of omega-3 PUFA. An example of changes in tissue lipid profiles associated with the consumption of Ahiflower oil is presented in a mouse feeding study.

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