

# Omega fatty acid balance can alter immunity and gene expression

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Using a controlled diet study with human volunteers, researchers may have teased out a biological basis for the increased inflammation observed due to humans' shift in their consumption of omega fatty acids.

For the past century, changes in the Western diet have altered the consumption of [omega-6 fatty acids](#) (w6, found in meat and vegetable oils) compared with [omega-3 fatty acids](#) (w3, found in flax and fish oil). Many studies seem to indicate this shift has brought about an increased risk of inflammation (associated with autoimmunity and allergy), and now using a controlled diet study with human volunteers, researchers may have teased out a biological basis for these reported changes.

Anthropological evidence suggests that human ancestors maintained a 2:1 w6/w3 ratio for much of history, but in Western countries today the ratio has spiked to as high as 10:1. Since these omega fatty acids can be converted into inflammatory molecules, this dietary change is believed to also disrupt the proper balance of pro- and anti-inflammatory agents, resulting in increased systemic inflammation and a higher incidence of problems including asthma, allergies, diabetes, and arthritis.

Floyd Chilton and colleagues wanted to examine whether these fatty acids might have other effects, and developed a dietary intervention strategy in which 27 healthy humans were fed a controlled diet mimicking the w6/w3 ratios of early humans over 5 weeks. They then looked at the gene levels of immune signals and cytokines (protein immune messengers), that impact autoimmunity and allergy in [blood](#)

[cells](#) and found that many key signaling genes that promote inflammation were markedly reduced compared to a normal diet, including a signaling gene for a protein called PI3K, a critical early step in autoimmune and [allergic inflammation](#) responses.

This study demonstrates, for the first time in humans, that large changes in gene expression are likely an important mechanism by which these omega fatty acids exert their potent clinical effects.

More information: Effect of dietary fatty acids on inflammatory gene expression in healthy humans, by Kelly L. Weaver, Priscilla Ivester, Michael C. Seeds, L. Douglas Case, Jonathan Arm and Floyd H. Chilton. Article Link: [www.jbc.org/cgi/content/abstract/M109.004861](http://www.jbc.org/cgi/content/abstract/M109.004861)

Source: American Society for Biochemistry and Molecular Biology

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