

New study finds fish oil omega-3s EPA and DHA work differently on chronic inflammation

7 December 2020



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The omega-3 fatty acids EPA and DHA work differently against chronic inflammation, according to the results of a small randomized study, suggesting each has its own important role to play in regulating the immune system.

The 34-week trial, led by researchers at the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University (HNRCA), compared the effects of the two omega-3s in a small group of older adults with obesity and chronic low-grade inflammation. The participants were randomly assigned to receive either EPA or DHA supplements twice a day. The results are published today in *Atherosclerosis*.

EPA and DHA, plentiful in fish and shellfish, have, in some studies, been linked to lower risk of heart disease and are believed to work by reducing inflammation. The results showed that DHA had a stronger anti-inflammatory effect than EPA:

- DHA lowered the genetic expression of four types of pro-inflammatory proteins, whereas EPA lowered only one type.
- DHA lowered white blood cell secretion of three types of pro-inflammatory proteins, whereas EPA lowered only one type.
- DHA also reduced levels of an anti-inflammatory protein, whereas EPA did not.

However, EPA improved the balance between pro- and anti-inflammatory proteins:

- After being metabolized, EPA produced by-products that were associated with immune function regulation and worked differently from those derived from DHA.

"The jury has been out, so to speak, on how the two major components of fish oil work—and whether one might be better than the other. These results suggest that DHA is the more powerful of the two on markers of inflammation in the body, but that's not the end of the story," said Stefania Lamon-Fava, a scientist on the Cardiovascular Nutrition Team at the HNRCA.

Lamon-Fava is also chair of the Division of Biochemical & Molecular Nutrition and an associate professor at the Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts.

"In our bodies, there is always this balance between pro-inflammatory and anti-inflammatory proteins, and we found EPA was better than DHA at enhancing that balance. For the prevention of cardiovascular disease, previous research tells us that balance is very important," explained first author Jisun So, who did this work as part of her dissertation at the Friedman School, working on the Cardiovascular Nutrition Team at the HNRCA.

According to the [2015-2020 Dietary Guidelines for Americans](#), adults should consume at least two servings of seafood (4 ounces per serving) weekly. Salmon, cod, sardines, trout and light, canned tuna are good sources of EPA and DHA.

"Our study gives us a snapshot of how EPA and DHA may work to reduce [chronic inflammation](#), and how each has distinct effects. Our results provide insight for future research to explore why that is the case and who would benefit from one or both of these healthy fats," Lamon-Fava said.

Methodology

The study was a [double-blind trial](#), meaning neither the participants nor the laboratory workers or scientists knew which supplement each individual received. The 21 participants received EPA or DHA supplements in a sequence that included supplement-free periods to create a blank slate from which to measure the impact of each supplement. During a lead-in phase, participants took supplements containing only high-oleic sunflower oil (similar to olive oil and not containing omega-3 fatty acids), to create a basis for comparison.

More information: Jisun So et al, EPA and DHA differentially modulate monocyte inflammatory response in subjects with chronic inflammation in part via plasma specialized pro-resolving lipid mediators: A randomized, double-blind, crossover study, *Atherosclerosis* (2020). [DOI: 10.1016/j.atherosclerosis.2020.11.018](#)

Provided by Tufts University

APA citation: New study finds fish oil omega-3s EPA and DHA work differently on chronic inflammation (2020, December 7) retrieved 17 June 2022 from <https://medicalxpress.com/news/2020-12-fish-oil-omega-3s-epa-dha.html>

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