



HOLY MACKEREL...OR MAYBE SARDINES

In [General Health](#), [General Practice](#), [Stress](#) by Donna Shryer July 6, 2021 [Leave a Comment](#)

Omega-3 fatty acids could help reduce depression

Before COVID-19 was even a word—let alone headline news—8.5% of US adults reported being depressed. Today, as the US struggles to recover from the pandemic, a recent study puts that stat at 27.8%, with around 1 in 4 US adults experiencing symptoms of depression.¹

With a long-standing mental health crisis only growing worse, various segments of healthcare are rethinking, repairing, and rebooting how the United States addresses mental health. Researchers are doing their part, too.

Case in point: investigators recently identified evidence that omega-3 polyunsaturated fatty acids (PUFAs) appear to reduce symptoms of depression. It turns out that fatty fish, like mackerel, tuna, and sardines, as well as fish oil supplements help manage more than physical challenges, such as high blood pressure, heart health, and triglycerides.

JUST THE FACTS

The study, conducted by researchers from the National Institute of Health Research (NIHR) Maudsley Biomedical Research Centre and published in *Molecular Psychiatry*, expanded on a well-accepted conclusion that omega-3 fatty acids produce anti-inflammatory effects that improve depression. The next step was to understand the mechanism by which PUFAs are metabolized into molecules—called lipid mediators—and how these lipid mediators, once in the bloodstream, cause improvements in depressive symptoms.²

To find an answer, the researchers first applied high doses of two specific PUFAs, eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), to lab-grown neurons. Next the PUFAs were administered to a small group of 22 study participants.

Lead author Alessandra Borsini, a postdoctoral neuroscientist at King's College London, said, "Using a combination of laboratory and patient research, our study has provided exciting new insight into how omega-3 fatty acids bring about anti-inflammatory effects that improve depression.

"For some time we have known that omega-3 PUFA can induce anti-depressant and anti-inflammatory effects but, without further understanding of how this happens in the human brain, it has been difficult to develop treatments. Our study has helped shine a light on the molecular mechanisms involved in this relationship, which can inform the development of potential new treatments for depression using omega-3 PUFA."

BUILDING ON THE FACTS

The previous research that Dr. Borsini alluded to concerns studies showing that those with a major depressive disorder have higher levels of inflammation in the body than those without a depressive disorder. In addition, previous studies have reported that EPA and DHA do trigger anti-inflammatory effects that positively impact depression.

Despite these insights, there is to date no anti-inflammatory treatment strategy for depression. This is largely because no one could yet explain the precise mechanism by which EPA and DHA are able to provide both anti-inflammatory and antidepressant effects.²

This recent study tested a theory that when omega-3 fatty acids are utilized and processed in the body, some of the PUFAs lipid mediators are able to protect the brain from the harmful effects of inflammation.

The researchers used a validated in vitro human cell model, known as “depression in a dish,” to study cells from the hippocampus, a part of the brain that is fundamental in many cognitive, memory, and learning areas, and is also believed to be a major player in depression.

The study showed that treating human hippocampal cells with EPA or DHA before being exposed to chemical messengers involved in inflammation called cytokines, prevented increased cell death and decreased neurogenesis. Both these impacts had been previously observed in cells exposed to cytokines alone.

Further investigation confirmed these effects were mediated by the formation of several key lipid mediators produced by EPA and DHA, and these were detected for the first time in human hippocampal neurons. Further investigation showed that treatment with an enzyme inhibitor increased the availability of two of these metabolites—suggesting a possible way by which future treatments could be optimized.

BY DESIGN

The study’s 22 participants, each diagnosed with major depression, received one of two PUFAs, either 3 grams of EPA or 1.4 grams of DHA, once a day for 12 weeks.

Lipid metabolites of EPA and DHA—byproducts after the body breaks down the PUFAs—were measured in the participants' blood before and after the omega-3 treatment, and their depression symptoms were also assessed.

In both groups, EPA or DHA treatment was associated with an increase in each participant's lipid metabolites as well as a "significant improvement" in depressive symptoms, with an average reduction in depression symptom scores of 64% and 71% in the EPA and DHA groups respectively.

The researchers noted that the levels of EPA and DHA used in this study cannot be achieved with dietary consumption of oily fish alone and would require therapeutic supplements.

The study researchers concluded that the bioactive lipid mediators produced by the breakdown of EPA and DHA in the body might be targeted as a mechanism to reduce depression and inflammation. That said, the researchers emphasized that additional and larger studies are needed to determine if these initial findings last long enough to be considered a feasible approach for depression treatment.

Senior author of the paper, Professor Carmine Pariante, NIHR Maudsley BRC Affective Disorders Interface with Medicine Theme Lead, acknowledged the growing interest in the links between the immune system, inflammation, and depression, but she added a word of caution, "It is important to highlight that our research has not shown that by simply increasing omega-3 fatty acids in our diets or through taking nutritional supplements we can reduce inflammation or depression. The mechanisms behind the associations between depression and omega-3 PUFA are complicated and require further research and clinical trials to fully understand how they work and inform future therapeutic approaches."

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