

# Fish Oil May Protect Against Alcohol-Related Dementia

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Exposure to a compound found in fish oil may protect against the development of dementia in heavy drinkers, new research suggests.

A study presented at the recent Congress of the European Society for Biomedical Research on Alcohol in Warsaw, Poland, examined rat brain cells exposed to alcohol levels equivalent to 4 times the legal driving limit.

Results showed that the cell cultures that were also exposed to omega-3 docosahexanoic acid (DHA) showed approximately 90% less neuroinflammation and 90% less neuronal brain cell death compared with the cells that were not exposed to the fish oil compound.

"We hypothesized that omega-3 fatty acids, specifically DHA (which has been shown to neuroprotect from other acquired brain insults in the laboratory and to some degree in human studies) would suppress or prevent the neuronal degeneration due to binge alcohol exposure," principal investigator Michael A. Collins, PhD, professor in the Department of Molecular Pharmacology and Therapeutics at the Stritch School of Medicine at Loyola University, Chicago, Illinois, told *Medscape Medical News*.

"And basically, that is what we found," he added.

## Relevant to Humans

Dr. Collins noted that although this was an animal study designed to measure neurodegeneration and related phenomena, and not a study specifically of dementia, "since brain degeneration underlies persistent or permanent dementia, the results were extrapolated to what might happen in humans."

And although he noted in a release that further studies are now needed, "fish oil has the potential of helping preserve brain integrity in abusers. At the very least, it wouldn't hurt them."

In 2011, Dr. Collins and colleagues [published a meta-analysis](#) of 143 studies showing that consuming up to 2 alcoholic drinks a day for men and 1 drink a day for women appeared to reduce the risk for dementia and cognitive impairment.

However, "too much alcohol overwhelms the cells," they noted in a release.

"Our previous work and that of others had linked neurodegeneration to 'neuroinflammatory'-like mechanisms that include oxidative stress (oxygen and nitrogen free radicals). The oxidative stress, we suspected, resulted in part from alcohol-induced excessive release of unsaturated fatty acids from brain membranes," explained Dr. Collins.

In the current study, the researchers exposed brain cell cultures from adult rats to heavy amounts of alcohol and then compared half the cells, which were further exposed to omega-3 DHA, with the other nonexposed half.

"Our results indicate excessive arachidonic acid (AA) mobilization due to increased phospholipase A2 (PLA2) levels/activity, and this appears related to elevations in astroglial aquaporin-4 (AQP4) and brain edema," write the investigators.

In other words, excessive drinking can cause higher levels of PLA2 activity, leading to excessive production of AA (a polyunsaturated omega-6 fatty acid), which in turn leads to increased AQP4/neuroinflammation and swelling of the brain.

However, inhibiting AQP4 was found to be neuroprotective to the cells.

### **Best Protection**

Adding omega-3 DHA to the cell cultures not only significantly decreased the release of AA and the elevated levels of PLA2 and AQP4 but also decreased ADP-ribose polymerase-1 (PARP1) elevations and overall neurodamage.

Dr. Collins reported that the investigators are planning now to conduct studies that replicate the findings in intact adult rats exposed to binge-drinking levels of alcohol and that elucidate how DHA exerts its protection in the brain.

However, he stressed that helping heavy drinkers to cut back the amounts they consume or to quit altogether is the best way to protect their brains.

"We don't want people to think it's okay to take a few fish oil capsules and then continue to go on abusing alcohol," he said.

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