

## Health News from 3Care Therapeutics

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### Increased levels of omega-3 fatty acid DHA may decrease the risk of dental diseases

The average number of dental disease events was 1.5 times higher in people with low DHA levels, compared to those with the highest average levels of DHA, according to findings published in *Nutrition*. In addition to being a major risk factor for tooth loss, periodontal disease has also been implicated as a risk factor for chronic diseases such as cardiovascular disease. Oral infection may contribute to the overall inflammatory burden of an individual and there are reports showing that this may explain an increased the risk of cardiovascular disease.

The heart health benefits of omega-3 fatty acids are well-documented, being first reported in the early 1970s by Jorn Dyerberg and his co-workers in *The Lancet* and *The American Journal of Clinical Nutrition*. To date, the omega-3 has been linked to improvements in blood lipid levels, a reduced tendency of thrombosis, blood pressure and heart rate improvements, and improved vascular function. However, links to dental health are not well documented. “To our knowledge, this is the first longitudinal study of the relation between periodontal conditions and dietary omega-3 fatty acids intake in older people,” wrote the researchers, led by Masanori Iwasaki from Niigata University.

The Japanese researchers recruited 55 people with an average age of 74 and calculated dietary intakes of omega-3. The average dietary intakes of EPA and DHA were 947.1 and 635.2 milligrams, respectively, said the researchers. Over the course of five years, the participants experienced an average of 7.8 periodontal disease events. “People with low DHA intake had an approximately 1.5 times higher incidence rate ratio of periodontal disease progression,” wrote the researchers. “The findings suggest there may be an inverse, independent relation of dietary DHA intake to the progression of periodontal disease in older people,” they said.

Commenting on the potential mechanism, the researchers note that it is probably related to the known anti-inflammatory effects of omega-3 fatty acids. “In periodontal diseases, bacteria trigger inflammatory host responses that cause destruction of the bone and periodontal connective tissue,” explained the researchers. “According to previous reports, DHA and EPA inhibit arachidonic acid conversion to inflammatory eicosanoids. They also give rise to mediators that are less inflammatory than those produced from AA or that are anti-inflammatory,” they added.

*Nutrition* - Published online ahead of print, doi: 10.1016/j.nut.2009.09.010 (for purchase)  
“Longitudinal relationship between dietary  $\omega$ -3 fatty acids and periodontal disease”  
Authors: M. Iwasaki, A. Yoshihara, P. Moynihan, R. Watanabe, G.W. Taylor, H. Miyazaki

### Olive oil component could help prevent Alzheimer’s

In findings published in the journal *Toxicology and Applied Pharmacology*, US scientists explain how **oleocanthal**, a naturally occurring compound found in olives, beneficially alters the structure of highly toxic proteins known as amyloid plaques or ADDLs.

“Our findings may help identify effective preventative measures and lead to improved therapeutics in the fight against Alzheimer’s disease.”

Dr. J Pitt

The researchers explain that ADDLs bind within the neural synapses of the brains of Alzheimer's patients and are believed to directly disrupt nerve cell function, eventually leading to memory loss, cell death and global disruption of brain function.

“Binding of ADDLs to nerve cell synapses is thought to be a crucial first step in the initiation of Alzheimer's disease,” said the lead research William L. Klein. “Oleocanthal alters ADDL structure in a way that deters the protein from binding to synapses.”

Reporting on a series of in vitro studies, the team of researchers found that incubation with [oleocanthal](#) changed the structure of ADDLs by increasing the protein's size.

Knowing that oleocanthal changed ADDL size, the researchers said they next evaluated whether oleocanthal affected the ability of ADDLs to bind to synapses of cultured hippocampal neurons.

The hippocampus, a part of the brain intimately involved in learning and memory, is one of the first areas affected by Alzheimer's disease.

Measuring ADDL binding with and without oleocanthal, the team said that they discovered that small amounts of oleocanthal effectively reduced short-term binding of ADDLs to hippocampal synapses, and additional studies revealed that oleocanthal can protect synapses from damage caused by ADDLs.

They reported that an unexpected finding of the research was that oleocanthal makes ADDLs into stronger targets for antibodies. This action establishes an opportunity for creating more effective immunotherapy treatments, which use antibodies to bind to and attack ADDLs, they added.

‘In addition to aiding therapeutics, enhancing ADDL immunoreactivity also could increase the sensitivity of antibody-based Alzheimer's diagnostics,’ said the scientists.

*Toxicology and Applied Pharmacology* Volume 240, Issue 2 October 2009

Title: Alzheimer's-associated A $\beta$  Oligomers Show Altered Structure, Immunoreactivity and Synaptotoxicity with Low Doses of Oleocanthal. Authors: J Pitt, W Roth, P Lacor, A B Smith III, M Blankenship, P Velasco, F De Felice, P Breslin, W. L. Klein

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