

# DHA is good for the brain, helps in Alzheimer's disease

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*Source:* <http://sci.tech-archive.net/Archive/sci.med.nutrition/2005-09/msg00341.html>

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- *From:* Matti Narkia <[mnng1@xxxxxxxxxxxxxx](mailto:mnng1@xxxxxxxxxxxxxx)>
  - *Date:* Mon, 12 Sep 2005 14:43:31 +0300
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Below some references about benefits of long chain omega-3 fatty acids for the brain function:

Lukiw WJ, Cui JG, Marcheselli VL, Bodker M, Botkjaer A, Gotlinger K, Serhan CN, Bazan NG.

A role for docosahexaenoic acid- derived neuroprotectin D1 in neural cell survival and Alzheimer disease.

J Clin Invest. 2005 Sep 8; [Epub ahead of print]

PMID: 16151530 [PubMed - as supplied by publisher]

<<http://www.jci.org/cgi/content/abstract/JCI25420v1>>

<<http://www.jci.org/cgi/reprint/JCI25420v1>> (full text)

<<http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=16151530>>

(full text)

Abstract:

"Deficiency in docosahexaenoic acid (DHA), a brain-essential omega-3 fatty acid, is associated with cognitive decline. Here we report that, in cytokine-stressed human neural cells, DHA attenuates amyloid-beta (Abeta) secretion, an effect accompanied by the formation of NPD1, a novel, DHA-derived 10,17S-docosatriene. DHA and NPD1 were reduced in Alzheimer disease (AD) hippocampal cornu ammonis region 1, but not in the thalamus or occipital lobes from the same brains. The expression of key enzymes in NPD1 biosynthesis, cytosolic phospholipase A(2) and 15-lipoxygenase, was altered in AD hippocampus. NPD1 repressed Abeta42-triggered activation of proinflammatory genes while upregulating the antiapoptotic genes encoding Bcl-2, Bcl-x1, and Bfl-1(A1). Soluble amyloid precursor protein-alpha stimulated NPD1 biosynthesis from DHA. These results indicate that NPD1 promotes brain cell survival via the induction of antiapoptotic and neuroprotective gene-expression programs that suppress Abeta42-induced neurotoxicity."

Comment:

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Fatty Acids: Good For The Brain, Good For Alzheimer Disease

<<http://www.sciencedaily.com/releases/2005/09/050911105120.htm>>

"A number of studies suggest a protective action of the fatty acid DHA in cognitive decline and in Alzheimer disease (AD). However, the molecular mechanism is not understood. In a paper appearing online on September 8 in advance of print publication of the October 1 issue of the Journal of Clinical Investigation, Nicolas Bazan and colleagues from Louisiana State University identify a specific mechanism by which DHA is neuroprotective in AD.

The authors report that DHA can decrease levels of the pathogenic Abeta peptides that are associated with Alzheimer disease pathology in human brain cells. Meanwhile, the synthesis of neuroprotectin D1 (NPD1), an endogenous DHA-derived messenger, is upregulated. NPD1 inhibits apoptosis triggered by Abeta peptides. In a human AD donor brain, the authors show that DHA and NPD1 are reduced in vulnerable brain regions.

This data raises the possibility that NPD1 is a key regulator of cell survival, and might be manipulated for the development of novel therapeutic strategies for neurodegenerative diseases."

Bazan NG.

Neuroprotectin D1 (NPD1): a DHA-derived mediator that protects brain and retina against cell injury-induced oxidative stress.

Brain Pathol. 2005 Apr;15(2):159-66. Review.

PMID: 15912889 [PubMed – indexed for MEDLINE]

<[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15912889](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15912889)>

Lim GP, Calon F, Morihara T, Yang F, Teter B, Ubeda O, Salem N Jr, Frautschy SA, Cole GM.

A diet enriched with the omega-3 fatty acid docosahexaenoic acid reduces amyloid burden in an aged Alzheimer mouse model.

J Neurosci. 2005 Mar 23;25(12):3032-40.

PMID: 15788759 [PubMed – in process]

<<http://www.jneurosci.org/cgi/content/abstract/25/12/3032>>

Abstract:

"Epidemiological studies suggest that increased intake of the omega-3 (n-3) polyunsaturated fatty acid (PUFA) docosahexaenoic acid (DHA) is associated with reduced risk of Alzheimer's disease (AD). DHA levels are lower in serum and brains of AD patients, which could result from low dietary intake and/or PUFA oxidation. Because effects of DHA on Alzheimer pathogenesis, particularly on amyloidosis, are unknown, we used the APPsw (Tg2576)

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transgenic mouse model to evaluate the impact of dietary DHA on amyloid precursor protein (APP) processing and amyloid burden. Aged animals (17–19 months old) were placed in one of three groups until 22.5 months of age: control (0.09% DHA), low–DHA (0%), or high–DHA (0.6%) chow. beta–Amyloid (Abeta) ELISA of the detergent–insoluble extract of cortical homogenates showed that DHA–enriched diets significantly reduced total Abeta by >70% when compared with low–DHA or control chow diets. Dietary DHA also decreased Abeta42 levels below those seen with control chow. Image analysis of brain sections with an antibody against Abeta (amino acids 1–13) revealed that overall plaque burden was significantly reduced by 40.3%, with the largest reductions (40–50%) in the hippocampus and parietal cortex. DHA modulated APP processing by decreasing both alpha– and beta–APP C–terminal fragment products and full–length APP. BACE1 (beta–secretase activity of the beta–site APP–cleaving enzyme), ApoE (apolipoprotein E), and transthyretin gene expression were unchanged with the high–DHA diet. Together, these results suggest that dietary DHA could be protective against beta–amyloid production, accumulation, and potential downstream toxicity."

Comment:

Fish Oil Holds Promise In Alzheimer's Fight

<http://www.sciencedaily.com/releases/2005/05/050528141248.htm>

"The new study involved older mice genetically altered to develop Alzheimer's disease. The researchers fed one group of the mice DHA–fortified chow. The control mice ate a normal or DHA–depleted diet.

After three to five months—the equivalent of several years in human biology—the high–DHA group had 70–percent less buildup of amyloid protein in the brain. This sticky protein makes up the plaques, or patches, that are a hallmark of Alzheimer's.

A similar study by Cole's group published in *Neuron* last fall showed that DHA protected against damage to the "synaptic" areas where brain cells communicate and enabled mice to perform better on memory tests.

The studies, say the scientists, suggest that even people who are genetically predisposed to the disease may be able to delay it by boosting their DHA intake.

Omega–3 fatty acids, typically deficient in the American diet, are essential for human health. DHA in particular is

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vital to proper brain function, as well as eye health and other body processes. In recent years epidemiologists have tied fish-rich diets to a lower incidence of Alzheimer's disease and homed in on DHA as the preventive factor. Omega-3 fatty acid supplements are now being tested in clinical trials with early-stage Alzheimer's patients in the United States, Canada and Sweden to see if the therapy really slows the disease."

Whalley LJ, Fox HC, Wahle KW, Starr JM, Deary IJ  
Cognitive aging, childhood intelligence, and the use of food supplements:  
possible involvement of n-3 fatty acids.

Am J Clin Nutr. 2004 Dec;80(6):1650-7.

PMID: 15585782 [PubMed – indexed for MEDLINE]

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15585782](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15585782)

"CONCLUSIONS: Food supplement use and erythrocyte n-3 content are associated with better cognitive aging. If associations with n-3 content are causal, optimization of n-3 and n-6 fatty acid intakes could improve retention of cognitive function in old age."

Colombo J, Kannass KN, Shaddy DJ, Kundurthi S, Maikranz JM, Anderson CJ, Blaga OM, Carlson SE.

Maternal DHA and the development of attention in infancy and toddlerhood.

Child Dev. 2004 Jul-Aug;75(4):1254-67.

PMID: 15260876 [PubMed – indexed for MEDLINE]

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15260876](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15260876)

" These findings are consistent with evidence suggesting a link between DHA and cognitive development in infancy. "

Daniels JL, Longnecker MP, Rowland AS, Golding J; ALSPAC Study Team.  
University of Bristol Institute of Child Health.

Fish intake during pregnancy and early cognitive development of offspring.

Epidemiology. 2004 Jul;15(4):394-402.

PMID: 15232398 [PubMed – indexed for MEDLINE]

[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=15232398](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=15232398)

"CONCLUSIONS: When fish is not contaminated, moderate fish intake during pregnancy and infancy may benefit development"

Kalmijn S, van Boxtel MP, Ocke M, Verschuren WM, Kromhout D, Launer LJ.

Dietary intake of fatty acids and fish in relation to cognitive performance at middle age.

Neurology. 2004 Jan 27;62(2):275-80.

PMID: 14745067 [PubMed – indexed for MEDLINE]

<http://www.neurology.org/cgi/content/abstract/62/2/275>

"Conclusions: Fatty fish and marine omega-3 PUFA consumption was associated with a reduced risk and intake of cholesterol and saturated fat with an increased risk of impaired cognitive function in this

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middle-aged population."

Helland IB, Smith L, Saarem K, Saugstad OD, Drevon CA.  
Maternal supplementation with very-long-chain n-3 fatty acids during pregnancy and lactation augments children's IQ at 4 years of age.  
Pediatrics. 2003 Jan;111(1):e39-44.  
PMID: 12509593 [PubMed – indexed for MEDLINE]  
<<http://pediatrics.aappublications.org/cgi/content/full/111/1/e39>>

"Conclusion. Maternal intake of very-long-chain n-3 PUFAs during pregnancy and lactation may be favorable for later mental development of children."

Wainwright PE.

Dietary essential fatty acids and brain function: a developmental perspective on mechanisms.  
Proc Nutr Soc. 2002 Feb;61(1):61-9. Review.  
PMID: 12002796 [PubMed – indexed for MEDLINE]  
<[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=12002796](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=12002796)>

Horrocks LA, Yeo YK.

Health benefits of docosahexaenoic acid (DHA)  
Pharmacol Res. 1999 Sep;40(3):211-25. Review.  
PMID: 10479465 [PubMed – indexed for MEDLINE]  
<[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=10479465](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=10479465)>

Kalmijn S, Feskens EJ, Launer LJ, Kromhout D.

Polyunsaturated fatty acids, antioxidants, and cognitive function in very old men.  
Am J Epidemiol. 1997 Jan 1;145(1):33-41.  
PMID: 8982020 [PubMed – indexed for MEDLINE]  
<[http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list\\_uids=8982020](http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=pubmed&dopt=Abstract&list_uids=8982020)>

"This study raises the possibility that high linoleic acid intake is positively associated with cognitive impairment and high fish consumption inversely associated with cognitive impairment."

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Matti Narkia

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### • *Follow-Ups:*

◆ ***Re: DHA is good for the brain, helps in Alzheimer's disease***

◇ *From:* Juhana Harju

• Prev by Date: ***Re: Long hours 'impair doctors' skills'***

• Next by Date: ***Re: Vitamin pill assimilation***

• Previous by thread: ***Before You Do Business with Natural Cures.com READ INSIDE***

• Next by thread: ***Re: DHA is good for the brain, helps in Alzheimer's disease***

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- Index(es):

- ◆ *Date*

- ◆ *Thread*