

OMEGA-3 FATTY ACIDS (EPA & DHA)



OmegaAdvance® & MacularProtect® Omega-3 Companion

Higher EPA & DHA Intake Lower Risk of Wet AMD in AREDS

Researchers examined the relationship of AMD case groups in the AREDS trial and intake levels of dietary fats. Only higher intake of total EPA and DHA and fish were linked to a decreased likelihood of having neovascular AMD. Participants consuming the highest amount of arachidonic acid, an omega-6 fatty acid abundant in meat and dairy, were 54% more likely to have late AMD. No significant relationships were observed for other dietary lipids or other AMD groups.

AREDS Report No. 20: The relationship of dietary lipid intake and age-related macular degeneration in a case-control study. *Archives of Ophthalmology* 125:671-9, 2007.

EPA and DHA Again Linked with AMD Risk Reduction

Dietary intake data and fundus images were available for 105 cases with neovascular AMD and for 2170 controls without any features of early or late AMD among participants in the EUREYE study. Habitual consumption of oily fish at least once a week was linked to a 50% reduction in the risk of developing wet AMD. Further, people who consumed at least 300 mg per day of DHA and EPA were 69% less likely to have wet AMD than those consuming less.

Augood C, et al. Oily fish consumption, dietary docosahexaenoic acid and eicosapentaenoic acid intakes, and associations with neovascular age-related macular degeneration. *American Journal of Clinical Nutrition* 88:398-406, 2008.

Review: Olive Oil, Polyphenolic Components Support Heart Health

Epidemiological and clinical studies report that the traditional Mediterranean-style diet is associated with lower mortality from coronary artery disease. Cumulative evidence suggests that olive oil may play a key role in the observed cardiovascular benefit. There are multiple mechanisms by which olive oil might impact the development of atherosclerosis. Olive oil decreases LDL-cholesterol and increases HDL-cholesterol, and also reduces oxidative stress due to its polyphenol content. In addition, olive

oil components such as oleuropein may interfere with the inflammatory response in atherosclerotic lesions, thus improving vascular stability.

Carluccio MA, et al. Review: Vasculoprotective potential of olive oil components. *Molecular Nutrition and Food Research* 51:1225-34, 2007.

Meta-Analysis Links EPA & DHA to AMD Risk Reduction

The long-chain omega-3 fatty acids EPA and DHA play an important role in the layer of nerve cells in the retina, and may be involved in the prevention or progression of AMD. Nine population-health studies, which included about 88,900 subjects, met the criteria for inclusion in this meta-analysis. The researchers found that a high dietary intake of EPA and DHA combined was associated with a 38% reduction in the risk of late AMD. EPA was linked to a 23% lower risk of early AMD, while DHA was associated with a 30% reduction. Fish intake at least twice weekly was also associated with a 24% and 33% reduced risk of early and late AMD respectively.

Chong EW-T, et al. Dietary n-3 fatty acids and fish intake in the primary prevention of AMD – a systematic review and meta-analysis. *Archives of Ophthalmology* 126:826-33, 2008.

Greater Intake of EPA & DHA Lowers Risk of Early, Late AMD

Investigators examining the relationship between dietary intake of omega-3 fats and incident AMD, observed a 59% risk reduction in those with the highest vs. lowest omega-3 intake. A 40% reduction of incident early AMD was associated with weekly fish consumption, while a nearly 70% reduction in the incidence of late AMD was linked to consuming fish at least 3 times a week. These findings are largely in agreement with those from other studies showing that diets high in omega-3, particularly DHA, may protect against retinal oxidation and degeneration.

Chua B, et al. Dietary fatty acids and the 5-year incidence of age-related maculopathy. *Archives of Ophthalmology* 124:981-6, 2006.

Omega-3 Diet Reduces Angiogenesis in Animal Model of Retinopathy

Researchers report that omega-3 fatty acids protect against the development and progression of retinopathy in an animal model. A small 2% change in omega-3 intake resulted in a 40-50% decrease in retinopathy severity. After initial loss, vessels regrew more quickly and efficiently in the omega-3 fed animals. The regrowth increased the oxygen supply to retinal tissue, resulting in a dampening of the inflammatory alarm signals that lead to abnormal vessel growth. In contrast, animals fed an arachidonic enriched diet had an increased inflammatory response. The omega-3 lipids play a modulating role in angiogenesis by regulating vessel loss and neovascularization.

Connor KM, et al. Increased dietary intake of n-3 polyunsaturated fatty acids reduces pathological retinal angiogenesis. *Nature Medicine* 13:868-74, 2007.

Olive Oil Clinically Shown to Lower Lipids, Reduce Oxidative Stress

The authors of this randomized, controlled cross-over study conclude that olive oil is more than a mono-unsaturated fat, and that its phenolic content can also provide benefits for plasma lipid levels and oxidative damage. Participants received olive oil with low, medium or high levels of phenolic compounds for 3 week periods. A linear increase in high-density lipoprotein (HDL) cholesterol levels and a decrease in triglyceride levels were observed. Oxidative stress markers decreased linearly with increasing phenolic content.

Covas MI, et al. The effect of polyphenols in olive oil on heart disease risk factors: a randomized trial. *Annals of Internal Medicine* 145:333-41, 2006.

Systematic Review Suggests Omega-3 Protective against Dementia

Accruing evidence suggests an inverse relationship between dietary intake of omega-3 polyunsaturated fatty acid (PUFA) and risk of dementia. Mechanisms that might qualify omega-3 PUFA as an interventional target for the primary prevention of dementia include its anti-atherogenic, anti-inflammatory, anti-oxidant, anti-amyloid and neuroprotective properties. In this systematic review, evidence from biological, observational and epidemiological studies suggests

a protective effect of omega 3 PUFA against dementia. However, data from randomized trials is needed.

Lim WS. Omega-3 fatty acid for the prevention of dementia. *Cochrane Database Systematic Reviews* CD005379, 2006.

Review: EPA & DHA Play Pivotal Role in Retinal Health and Disease

According to NEI reviewers, EPA and DHA may play a role in AMD, diabetic retinopathy and retinopathy of prematurity. EPA and DHA may help protect against factors such as ischemia, damage from light exposure reactive oxygen species and free radicals, inflammation, and age-related retinal changes. These omega-3 fatty acids can influence key processes such as retinal cell signaling, gene expression, differentiation and retinal cell survival. The role of EPA and DHA in retinal health and disease is important because tissue stores of these lipids can be modified through dietary intake.

SanGiovanni JP and Chew EY. The role of omega-3 long-chain poly-unsaturated fatty acids in health and disease of the retina. *Progress in Retinal Eye Research* 24:87-128, 2005.

Reviews: Fish Oil Reduces Mortality, Cardiac & Sudden Death Rates; Beneficial for Everyone

An NIH-commissioned, systematic review¹ of randomized controlled trials, prospective cohort and case-control studies, concludes that EPA and DHA rich-fish or fish oil supplements reduce the rates of all-cause mortality, cardiac and sudden death, and possibly stroke. The data for the shorter chain omega-3 alpha linolenic acid is limited and typically of poor quality. A more recent review² concludes that fish oil benefits healthy individuals as well as those with heart disease. The authors recommend that healthy people consume at least 500 mg of EPA/DHA per day, while those with coronary heart disease or heart failure should obtain about 1,000 mg daily.

¹**Wang C, et al. n-3 fatty acids from fish or fish-oil supplements, but alpha-linolenic acid, benefit cardiovascular disease (CVD) outcomes in primary- and secondary-prevention studies: a systematic review. *American Journal of Clinical Nutrition* 84:5-17, 2006.**

²**Lavie DJ, et al. Omega-3 polyunsaturated fatty acids and cardiovascular disease. *Journal of the American College of Cardiology* 54:585-94, 2009.**