

OPTIC NERVE FORMULA®



Vitamin E Clinically Demonstrates Neuroprotection

In this controlled trial, researchers report that supplemental vitamin E improved blood flow and slowed disease progression in glaucomatous patients who were given daily doses of 300 IU or 600 IU vitamin E, or placebo for 12 months. Compared with those receiving vitamin E, non-treated subjects showed a significant reduction in visual field at 6 and 12 months. The authors conclude that vitamin E deserves more attention in preventing glaucomatous damage.

Engin KN et al. Clinical evaluation of the neuroprotective effect of alpha tocopherol in glaucomatous damage. *European Journal Ophthalmology* 17:528-33, 2007.

Oxidative Damage to Trabecular Meshwork Seen in Glaucoma

Increasing evidence suggests that oxidative damage to the trabecular meshwork is involved in glaucoma. Investigators observed more than a 3-fold increase in levels of DNA damage in the meshwork tissue of glaucoma patients compared to age and gender matched controls. The increased DNA damage correlated significantly with clinical parameters such as visual field losses and IOP indexes.

Izzotti A et al. Oxidative deoxyribonucleic damage in the eyes of glaucoma patients. *American Journal Medicine* 114:638-46, 2003.

Review: Natural Therapeutic Approaches in Glaucoma Therapy

Glaucoma is increasingly recognized as a condition for which not only elevated IOP, but also non-pressure-dependent risk factors are responsible. Better knowledge of the pathogenesis has opened new avenues of investigative treatments which include improving vascular regulation and blood flow to the eye, and reducing oxidative stress. Omega-3 fatty acids and Ginkgo biloba are being studied for their effects on blood flow regulation, while antioxidant vitamins and nutrients such as anthocyanosides and polyphenolic compounds show potential in oxidative stress reduction.

Mozffarieh M and Flammer J. Review: A novel perspective on natural therapeutic approaches in glaucoma therapy. *Expert Opinion on Emerging Drugs* 12:195-98, 2007.

Omega-3 Diet Decreases IOP in Animals

To determine whether there is an association between dietary omega-3 fatty acid intake, age, and intraocular pressure (IOP) caused by altered aqueous outflow, lab animals were fed either omega-3-sufficient or deficient diets from conception. Animals raised on higher omega-3 diets had a 13% decrease in IOP at 40 weeks. When considered as a change in IOP relative to 5 weeks of age, the omega-3 fed group showed a 23% decrease. This lower IOP was associated with a significant increase in outflow facility and a decrease in ocular rigidity. The authors conclude that increasing dietary omega-3 reduces IOP with age, and suggests that dietary manipulation may provide a modifiable factor for IOP regulation.

Nguyen CT et al. Dietary omega 3 fatty acids decrease intraocular pressure with age by increasing aqueous outflow. *Investigative Ophthalmology Visual Science* 48:756-62, 2007.

Ginkgo Biloba Clinically Shown to Improve Visual Field Indices

There is growing awareness that the prevalence of normal-tension glaucoma (NTG) is greater than previously realized, and that progressive damage can occur even with IOP-lowering intervention. The effects of Ginkgo biloba, which has been shown to increase ocular blood flow in humans, was examined in patients with bilateral visual field damage resulting from NTG in a prospective, randomized double-blind crossover trial. Treatment with 120 mg of Ginkgo daily for 4 weeks was found to significantly improve visual field indices compared to placebo.

Quaranta L et al. Effect of Ginkgo biloba extract on preexisting visual field damage in normal tension glaucoma. *Ophthalmology* 110:359-62 2003.

Lower Levels of EPA and DHA Seen in Glaucoma Patients

Increased intraocular pressure and vascular factors such as ocular blood flow deficits are thought to be risk factors for POAG. There is evidence of decreased optic nerve blood velocity and increased red blood cell aggregability in POAG—factors that are influenced by fatty acids. This study reports that patients with POAG had significantly reduced levels of red blood cell and plasma EPA and DHA compared with their healthy siblings. These findings may be significant, since EPA and DHA could modulate impaired systemic microcirculation, ocular blood flow and optic neuropathy which are the main changes associated with glaucoma.

Ren H et al. Primary open-angle glaucoma patients have reduced levels of blood docosahexaenoic and eicosapentaenoic acids. *Prostaglandins Leukotrienes Essential Fatty Acids* 74:157-63, 2006.

Antioxidants Protect Meshwork Cells in Experimental Study

The results of this experimental study support the hypothesis that a defect in mitochondrial complex I contributes to progressive loss of trabecular meshwork cells in glaucomatous patients, and that it does so by promoting excessive production of reactive oxygen species in the mitochondria. The researchers also determined that vitamin E, n-acetyl cysteine (a key component of glutathione), and cyclosporine A protected meshwork cells from cytotoxicity, suggesting that antioxidants may be beneficial in primary-angle glaucoma.

Yuan He et al. Mitochondrial Complex I defect induces ROS release and degeneration in trabecular meshwork cells of POAG patients: Protection by Antioxidants. *Investigative Ophthalmology Visual Science* 49:1147-58, 2008.