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Short Communication

Coenzyme Q10 and Neuroprotection

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The retina is the most metabolically active tissue in the body, with the highest consumption of energy per unit area of tissue [1]. CoQ10 deficiency may cause retinopathy alone or as part of a syndrome. CoQ10 may play a role in the pathogenesis of retinal diseases. Age-related macular disease (AMD) is a major cause of visual impairment in elderly patients. They suffer from a loss of central vision. In AMD patients, CoQ10 plasma levels revealed lower than age-matched control subjects. These data suggest an association between oxidative stress and the pathogenesis of AMD.

Glaucoma is the second leading cause of blindness worldwide. The first and most important risk factor for retinal ganglion cell (RGC) death and optic nerve degeneration is elevated intraocular pressure (IOP). The acute IOP elevation alters mitochondrial proteins and induces mitochondrial apoptotic cell death in mouse and human being [2]. It is associated with mitochondrial apoptotic pathway in the retina. Coenzyme Q10 (CoQ10) is an ubiquitous cofactor in the body. CoQ10 is a cofactor of the electron transport chain and acts by maintaining the mitochondrial membrane potential. It supports ATP synthesis and inhibits reactive oxygen species (ROS). Coenzyme Q10 scavenges reactive oxygen species and protects neuronal cells against oxidative stress in neurodegenerative diseases, suc as age-related macular disease (AMD), glaucoma, Alzheimer's disease (AD), Parkinson's disease (PD) and Leber hereditary optic neuropathy [3].

Glaucoma is an optic neuropathy, characterized by a loss of retinal ganglion cells (RGC). Levels of CoQ10 decline with age and oxidative stress increases [4-6]. This is a therapeutic rationale to supplement older and ill patients with CoQ10. It may be useful also in the prevention of lens epithelial cells death and consecutive cataract formation *in vivo* [7]. The route of administration may be oral (two tablets a day) in patients affected by open angle glaucoma (unpublished data) and topical. A combination of crosslinked hyaluronic acid, CoQ10 and vitamin E is protective for ocular surface also in people attending swimming pools [8]. In glaucomatous patients it shows a beneficial effect on the inner retinal function (PERG improvement) with enhancement of the visual cortical responses (VEP improvement) [9].

Disclosure

The author declares to have no financial interest in any drug cited in this paper.

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