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Taurine: A nutritional anti-oxidant for retinal neuroprotection

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Taurine is a small sulphur amino-acid which represents the most abundant amino-acid in retina. Although taurine is synthesized endogenously, the major source of taurine is coming from nutrition. Previous old studies had shown that taurine depletion induced either by taurine-free diet or by chronic administration of taurine transporter selective blocker, is able to generate severe retinal damages. More recently, we elucidated that the retinal toxicity of the anti-epileptic drug, vigabatrin, was due to a taurine depletion. This retinal toxicity is characterized by cone damages, and more interestingly, by a parallel loss of retinal ganglion cells. Accordingly, this taurine dependence of retinal ganglion cell (RGC) survival was further demonstrated on different models of RGC degeneration. Indeed, we found that taurine can directly prevent RGC degeneration, occurring either in serum-deprived pure RGC cultures or in NMDA-treated retinal explants. In animal model of glaucoma showing a primary RGC degeneration, we found that a chronic taurine supplementation through drinking water can rescue the RGC loss. Such taurine supplementation also prevents the secondary RGC degeneration occurring after photoreceptor loss in a rat model of retinitis pigmentosa (P23H rats). These results led us to hypothesize that any reduction in the retinal blood perfusion can lead to a decrease in retinal taurine uptake from the blood, and thus to the consecutive retinal ganglion cell loss. Thus the retinal taurine level may represent a crucial marker to prevent RGC damage in major retinal diseases.

Biography

Nicolas Froger has a Ph.D. in neuropharmacology from Pierre et Marie Curie University in Paris. He then investigated neuroglial interaction at College de France. He is currently Project Manager in neuroprotection at Vision Institute. He has published more than 20 papers in peer-reviewed journals and more than 10 communications in international meetings.

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