

# MMPs in the neuroretina and optic nerve: modulators of glaucoma pathogenesis and repair?

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Multiple studies in glaucoma patients and in animal models of spontaneous and experimentally-induced glaucoma, reported changes in the expression and activity of several matrix metalloproteinases (MMPs) in the retina, optic nerve, aqueous humor, and trabecular meshwork.

These data have led to the hypothesis that MMPs might be involved in glaucoma onset and/or disease progression. However, reports are conflicting and research aiming at providing a clear definition of their causative role is lacking. In glaucoma, MMPs are thought to act at two different levels. In the trabecular meshwork, they fine-tune the aqueous humor outflow rate and intraocular pressure, in the neuroretina and optic nerve, however, their role during glaucoma disease progression is much less clear.

This review provides a comprehensive overview of the research conducted on the expression and function of MMPs in the retina and optic nerve, and on the elucidation of their potential involvement during glaucoma pathogenesis. Additionally, we describe the insecure balance between detrimental and potential beneficial MMP activities during central nervous system recovery and how MMP-based therapies could help to overcome the current pitfalls in the development of retinal ganglion cell neuroprotection and axon regeneration approaches for the treatment of glaucoma.

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