IOP induces upregulation of GFAP and MHC-II and microglia reactivity in mice retina contralateral to experimental glaucoma

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BACKGROUND: Ocular hypertension is a major risk factor for glaucoma, a neurodegenerative disease characterized by an irreversible decrease in ganglion cells and their axons. Macroglial and microglial cells appear to play an important role in the pathogenic mechanisms of the disease. Here, we study the effects of laser-induced ocular hypertension (OHT) in the macroglia, microglia and retinal ganglion cells (RGCs) of eyes with OHT (OHT-eyes) and contralateral eyes two weeks after lasering.

METHODS: Two groups of adult Swiss mice were used: age-matched control (naive, n = 9) ; and lasered (n = 9) . In the lasered animals, both OHT-eyes and contralateral eyes were analyzed. Retinal whole-mounts were immunostained with antibodies against glial fibrillary acid protein (GFAP) , neurofilament of 200kD (NF-200) , ionized calcium binding adaptor molecule (Iba-1) and major histocompatibility complex class II molecule (MHC-II) . The GFAP-labeled retinal area (GFAP-RA) , the intensity of GFAP immunoreaction (GFAP-IR) , and the number of astrocytes and NF-200 + RGCs were quantified.

RESULTS: In comparison with naive: i) astrocytes were more robust in contralateral eyes. In OHT-eyes, the astrocyte population was not homogeneous, given that astrocytes displaying only primary processes coexisted with astrocytes in which primary and secondary processes could be recognized, the former having less intense GFAP-IR (P CONCLUSION: The use of the contralateral eye as an internal control in experimental induction of unilateral IOP should be reconsidered. The gliotic behavior in contralateral eyes could be related to the immune response. The absence of NF-200+RGCs (sign of RGC degeneration) leads us to postulate that the MHC-II upregulation in contralateral eyes could favor neuroprotection.

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