**Instructions**

**Personal details**

Research Number: 3000006102

Title: Evaluation of the phosphatases role in the aqueous humor of glaucoma patients

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**Abstract**

**Background:** Oxidative stress was established as a contributor to the development of ocular pathology in glaucoma and cataract. Changes in the aqueous humor (AH) antioxidant capacity were measures in glaucoma patients and the effects of oxidative stress on phosphatase activity were demonstrated in other tissues. In general phosphatases are active in parallel to kinase activity. Limited data is available regarding kinase activity in the AH, and even less is known about AH phosphatases in health and disease.

**Research Hypothesis:** Phosphatases who play a major role in cellular homeostasis, are involved in the pathophysiology of open angle glaucoma.

**Aims:** To investigate the presence and activity of Protein Phosphatase-2A (PPase2A), Protein Phosphatase-2C (PPase2C) and protein tyrosine phosphatases (PTPs) in human AH from primary open angle glaucoma (POAG) and cataract patients, and to study the correlation between these phosphatases and the redox state of the AH.

**Methods:** 86 cataract patients and 29 POAG patients who were scheduled for cataract surgery with or without glaucoma surgery were enrolled in the study. PPase2A, PPase2C and PTPs levels in AH were measured by enzyme-linked immunosorbent assays, western blot analyses, and spectral methods. Redox state was measured by spectral and fluorescent methods.

**Results:** Phosphatase activity positive results was significantly higher in AH samples from the POAG group (PP2A $\chi^2(1)=11.754, p<0.01$; PP2C $\chi^2(1)=8.754, p<0.01$; PTP $\chi^2(1)=11.073, p<0.01$). Western blot analysis revealed higher PP2C levels in AH from glaucoma patients compared with PP2C levels in AH from cataract patients ($p=0.012$). Both oxidized/reduced glutathione ratio and superoxide dismutase levels in the AH were significantly higher in the glaucoma group compared with the cataract group. Finally significant correlations were found between PP2A and PP2C; PP2A and PTP; and between total antioxidant activity and PTP levels.

**Conclusions:** There is a statistically significant difference in phosphatase levels between the AH of POAG and that of cataract patients. The phosphatase content of the AH represent tissue pathology, while considering that their AH presence may be attributed to cell debris and/or to active signal to other molecule events. This research open the way to further research who might contribute to a new pharmacologic intervention site in glaucoma treatment.

Key words [Glaucoma, phosphatase, aqueous humor, antioxidant, redox]
In addition
Publications associated with the project