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Conjunctival tissue proteome demonstrates abnormal expression of wound response proteins in glaucoma patients
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Purpose: Medically uncontrolled glaucoma is usually treated surgically. Postoperative scarring and fibrosis often occur as adverse outcomes requiring additional treatment and cause surgical failure. Using a novel proteomic analysis conjunctival health was evaluated in conjunctival specimens of glaucoma patients at the time of operation and compared to healthy conjunctiva.

Methods: Conjunctival tissues (1x2-5mm) were collected from 34 glaucoma patients undergoing glaucoma surgery after long-term (2-21 years) use of topical antiglaucoma medication. Conjunctival tissues of 8 strabismus surgery patients were used as controls. Proteins derived from conjunctival tissues were analyzed for library generation using UniProtKB/SwissProt database. Relative quantification of protein expression levels in 4 μg of each biopsy sample was done by NanoLC-MS TripleTOF using SWATH acquisition. Statistical and MS data analysis were performed with extensive software by Sciex and David Bioinformatics.

Results: A protein identification library consisting of >1800 proteins (FDR 1%) was established. In total >1550 proteins were identified and quantified in each sample. GO analysis of the conjunctiva proteome revealed 85 wound response associated proteins of which 48 were differentially expressed (p≤0.05) between glaucoma and control patients. A number of proteins were under-expressed in glaucoma, such as complement factors (≥1.5 fold), fibrinogens (≥2 fold) and serpinase family proteins (≥1.6 fold). Known tear fluid function-related proteins such as lysozyme decreased 2-fold and a plasma protein clusterin was up regulated 1.5-fold in conjunctival tissue from glaucoma patients.

Conclusions: Proteomic analysis of conjunctiva demonstrates protein profile of >1800 proteins and offers a powerful tool to further analyze processes like inflammation and wound healing in glaucoma patients who may be at risk from chronic use of glaucoma medications. It will also give an opportunity to further analyze the role of pathogenic mechanisms leading to failure in glaucoma surgery and to develop novel therapies for glaucoma patients.

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