Wound healing response after minimally invasive glaucoma surgery in the rabbit

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Purpose: Glaucoma is the leading cause of irreversible blindness worldwide. The primary risk factor for glaucoma is increased intraocular pressure (IOP). Current treatments focus on reducing IOP via drugs or surgical interventions. Although surgical intervention is highly effective, clinicians tend to withhold from surgery and possible vision threatening complications. Approximately 10% of surgeries that depend on a filtering bleb fail due to postoperative formation of fibrosis. During this study, we aimed to identify potential cellular targets for the development of anti-fibrotic therapies.

Methods: Fifteen rabbits were implanted with a SIBS microshunt. *In vivo* IOP was measured, and bleb survival was assessed. Optical coherence tomography (OCT) and slit-lamp (SL) examinations were used to assess ocular health throughout the experiment. Animals were euthanized at post-operative day (POD) 1, 5 and 40 for histological evaluation.

Results: Blebs failed around POD 15, IOP measurements revealed a lower IOP at POD 1 compared to baseline (P=0.007), indicating a successful implantation. No severe complications related to the surgery were seen. Histological analysis showed a wide variety of cells present throughout different

postoperative days, including granulocytes (POD 1 and 5), leucocytes (POD 5 and 40), fibroblasts (POD 1, 5 and 40), myofibroblasts (POD 40), and foreign body giant cells (POD 5 and 40). Additionally, the conjunctiva was thicker at POD 1 and 5.

Conclusions: A high diversity of cells was involved during the wound healing response after implantation with a SIBS microshunt, including granulocytes, leucocytes, foreign body giant cells, and epithelial cells. These cells could offer potential targets for the development of novel anti-fibrotic therapies.