ROLE OF PLACENTAL GROWTH FACTOR (PLGF) IN WOUND HEALING AFTER GLAUCOMA FILTRATION SURGERY

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BACKGROUND AND AIM OF THE PROJECT

Failing filtering surgery due to excessive wound healing is a considerable challenge in ophthalmology, and largely contributes to progressive vision loss in glaucoma patients. Anti-VEGF therapy helps to prevent post-surgical scarring by inhibiting angiogenesis and collagen deposition, but does not influence inflammation (which is also an important player in postoperative wound healing) (1). We will check the hypothesis that placental growth factor (PLGF) plays a role in scar formation after glaucoma filtration surgery, and that it may be an (additional) target for improvement of the outcome of this surgery through its known anti-angiogenic and anti-inflammatory, and possibly anti-fibrotic properties (2-3).

DEVELOPMENT OF THE PROJECT

Previous results showed an upregulation of PlGF in aqueous humor of glaucoma patients (*unpublished data*). This may indicate that PlGF plays a role in ocular wound healing, but it is at present unclear whether elevated PlGF is causative to or consequential of glaucoma or any aspect of glaucoma. We will therefore investigate the role of PlGF(-inhibition) in ocular wound healing (*in vitro* and *in vivo*).

First, we will test the *in vitro* role of PlGF(-inhibition) on HUVEC, Jurkat cells and Tenon fibroblasts (the key players in wound healing). Serum-free medium containing different concentrations of PlGF will be added. In another series of experiments, cells will be pre-incubated with different concentrations of the PlGF-antibody (*ThromboGenics* NV) and then grown in complete medium. Forty-eight hours after administration, cell proliferation will be assessed using the WST-1 Cell Proliferation Assay System. Secondly, we will investigate the *in vivo* effects of PlGF-inhibition in a rabbit model for glaucoma filtration surgery. Both eyes will undergo a filtration surgery, one eye will be treated and the other eye will be used as a control. One group of rabbits will be treated with PlGF-antibody (Ab) alone and in another group the PlGF-Ab will be combined with anti-VEGF Ab (bevacizumab) to investigate the synergistic effect of both Abs. Different (immuno)stainings will show us the blood vessel density, inflammation and fibrosis on different time points after surgery. These immunohistochemical analyses, together with the clinical investigation of the rabbits (IOP and bleb area) will indicate the surgical outcome.

CONCLUSION

Our proposed research project will elucidate the potential role of PlGF (-inhibition) in the improvement of filtration surgery outcome, and

will highlight any angiostatic, anti-inflammatory, and/or anti-fibrotic effects. PlGF-inhibition as an adjuvant anti-inflammatory therapy to anti-VEGF treatment in glaucoma surgery might open new perspectives for more efficient surgery.

REFERENCES

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