Human Complement Sera stimulates Basolateral Secretion of VEGF by Retinal Pigment Epithelial Cells

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Purpose. A mutation in the complement factor H (CFH) gene, leading to increased complement activation, is correlated with the development of age-related macular degeneration (AMD). Therefore, the influence of complement on human retinal pigment epithelial (RPE) cells was examined in respect to their polarized secretion of vascular endothelial growth factor (VEGF).

Methods. RPE cells were cultured on transwell filters with DMEM and 1 % foetal calf serum. At six weeks post confluence, when the RPE have pigmented, the density of the cell monolayer was measured by a permeability assay using sodium fluorescein. The cells were treated with human complement sera for 24 hours. The amount of VEGF secreted into the media was quantified by enzyme-linked immunosorbent assay. Furthermore, the cellular distribution of VEGF in complement treated cells grown in chamber slides was detected by immunocytochemistry, and PCR analysis was used to determine the expression of the growth factor in RPE cells.

Results. Untreated RPE cells produced VEGF constitutively. Basal stimulation of polarized cells with human complement sera led to a concentration dependent increased release of the growth factor towards the basal compartment. Immunocytochemical staining and PCR analysis for VEGF also demonstrated a concentration dependent enhancement in response to complement.

Conclusions. VEGF production towards the basal side was strongly increased when RPE cells were exposed to human complement sera applied to the basal side. Therefore, complement might play a significant role in AMD, as VEGF is known to stimulate vessel growth in the choroid and support pro-angiogenic processes.

Supported by Voltmann Foundation and Akademie des Sehens