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Regulation of retinal pigment epithelial (RPE) cell function by TGF-b Super family

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Purpose: TGF-b super family comprises different multifunctional proteins (TGF-b, actives, bone morph genetic proteins (BMPs) which may modulate RPE cell functions. In the present study, in order to investigate the possible interaction of TGF-b super family with RPE cell function, the following questions were raised: 1. Are there TGF-b receptors in the RPE? 2. Can RPE produce TGF-b? 3. TGF-b can modulate RPE function?

Methods: Human RPE cell line D407 was used in all experiments. The expression of RNA related to TGF-b super family receptors (6 different receptors type I and 4 different receptors type II) were assayed by reverse transcriptase-polymerase chain reaction (RT-PCR). The RNA related to transduction of TGF-b family member genes (Smad1 through Smad4) were also detected by RT-PCR. The effects of TGF-b on the intracellular position of Smad were studied by immunoperoxidase and immunofluorescence. The effects on the migration (using a wound healing model) and the proliferation of RPE (by [3H] thymidine incorporation) were also investigated.

Results: The TGF-b receptors type II and I was detected in RPE culture. RNA for Smad1 through 4 was also present in the RPE cells. These results suggest that TGF-b may exert some effect on D407 RPE through its specific receptor. TGF-b signal transducer Smad migrated from the cytoplasm to the nucleus after TGF-b. TGF-b stimulated the RPE migration, but the D407 RPE proliferation was significantly inhibited by 1 or 10 ng/ml of TGF-b1.

Conclusion: TGF-b super family can regulate RPE cell function through their specific signal transduction pathways.