

Oral presentation

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Retinol effects on CSF outflow through cultured human arachnoid granulation cells: implications for PTC

David W Holman¹, Martin Lubow¹ and Deborah M Grzybowski*^{1,2}

Address: ¹Department of Ophthalmology, Neuroophthalmology Research Division, The Ohio State University, College of Medicine, Columbus OH 43210, USA and ²Department of Biomedical Engineering Center, The Ohio State University, College of Medicine, Columbus OH 43210, USA

Email: Deborah M Grzybowski* - grzybowski.3@osu.edu

* Corresponding author

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Background

The underlying etiology of pseudotumor cerebri (PTC) remains unknown, however it has been estimated that an identifiable secondary cause is present in up to 10% of PTC cases. Of these secondary associations, vitamin A is of particular interest, as vitamin A toxicity is associated with an increased intracranial pressure similar to that seen in PTC. Recently, several clinical studies have suggested that serum and CSF retinol levels may be altered in PTC. We hypothesize that increased concentrations of retinoids in the CSF might increase resistance to CSF outflow at the arachnoid granulations (AGs).

Materials and methods

Cultured human AG cells were exposed to a range of concentrations of all-trans-retinol. Several parameters were measured including viability, proliferation, and protein expression. Viability and proliferation were assessed using commercially available assays. Protein expression was qualitatively examined using immunofluorescent staining for several extracellular matrix and junctional proteins.

Results

AG cells remained viable over the range of retinol concentrations tested. In addition, retinol decreased AG cell proliferation in a concentration dependent manner. AG cells exposed to 1 μ M retinol exhibited a statistically significant decrease in proliferation (p-value < 0.01) at 24 and 48 hours compared to controls. AG cells exposed to 1 μ M retinol for 5 days exhibited no qualitative difference in the

expression of the extracellular matrix proteins collagen-IV, laminin, and fibronectin compared to controls.

Conclusion

We have tested the effects of vitamin A (retinol) on the arachnoid cells of the CSF outflow pathway. Our results indicate that retinol inhibits growth and proliferation of AGs cells. We have begun to examine if the decrease in proliferation is marked by differentiation and changes in protein expression that might lead to increased resistance to CSF outflow. Future studies will examine the effects of retinol on barrier integrity and outflow resistance of AGs cells. These results have implications for any disorder of CSF homeostasis.