



THE OCULAR IMMUNOLOGY
AND UVEITIS FOUNDATION

Dedicated to Eye Disease Cure and Education

Fibronectin

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Fibronectin (previously known as cold insoluble globulin) is a plasma protein with multiple functions, but with most notably facilitation of cell-cell and cell-matrix interactions. The first report of its presence in the eye was in 1984. Not all species express fibronectin at the epithelial basement membrane zone, but all have the appearance of fibronectin on the denuded surface of the cornea after corneal wounding. We wondered whether or not this suggested that fibronectin was an essential element for epithelial migration across the surface of the wounded cornea, and whether or not exogenously added fibronectin might enhance the speed of wound healing after corneal wounding. Initial uncontrolled, non-randomized clinical studies suggested that this might be so. But, as is so often the case with unmasked, uncontrolled studies by the paucity of such individuals.

But our work suggests, that rather than any single molecule, a "cocktail" might be the most effective strategy in encouraging closure of the epithelium over the wounded cornea. Such a "cocktail" might include cellular fibronectin, epidermal growth factor, fibroblast growth factor, insulin-like growth factors, collagenase inhibitors, and perhaps even corticosteroid. The sad truth is that there seems to be no magic elixir which is clinically useful in achieving the goal of getting persistent or recurrent epithelial defects to close and to stay closed in patients with ocular surface disease. We have now abandoned our hope of discovering such a "recipe" and now find ourselves primarily dependent on tarsorrhaphy for patients with an anesthetic corneas, and amniotic membrane grafting with or without limbal stem cell grafting and fitting of scleral lenses with specialized chambers behind them to retain fluid in patients with limbal stem cell deficiency and/or extremely poor subepithelial substrate or basement membrane secondary to various forms of corneal trauma and ocular surface disease.

- REFERENCES:** 1. Fujikawa LS, Foster CS, Gipson IK, Colvin RB. 1984. Basement Membrane Components in Healing Rabbit Corneal Epithelial Wounds: Immunofluorescence and Ultrastructural Studies. *J Cell Biol* 98:128-138.
2. Singh G, Foster CS. 1988. Treatment of Nonhealing Corneal Ulcers and Recurrent Corneal Erosions. *The Cornea: Transactions of the World Congress on the Cornea III*, (Ed. Cavanagh HD) Raven Press, NY. pp. 45-53.
3. Singh G, Foster CS. 1989. Growth Factors in Treatment of Nonhealing Corneal Ulcers and Recurrent Erosions. *Cornea*. 8(1):45-53.

4. Phan T-MM, Foster CS, Wasson PJ, Fujikawa LS, Zagachin LM, Colvin RB. 1989. Role of Fibronectin and Fibrinogen in Healing of Corneal Epithelial Scrape Wounds. *Invest. Ophthalmol. Vis. Sci.* 30(3):377-385.
5. Phan T-MM, Foster CS, Zagachin LM, Colvin RB. 1989. Role of Fibronectin in the Healing of Superficial Keratectomies In Vitro. *Invest. Ophthalmol. Vis. Sci.* 30(3):386-391.
6. Phan T-MM, Foster CS, Boruchoff SA, Zagachin LM, Colvin RB. 1987. Topical Fibronectin in the Treatment of Persistent Corneal Epithelial Defects