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## **Dynamic Assessment of Corneal Fibroblast Mechanical Behavior within 3-D Collagen Matrices**

The organization of extracellular matrices by cells through the exertion of mechanical forces drives fundamental processes such as developmental morphogenesis, wound healing, and remodeling of bioengineered tissues. Our laboratory has developed an experimental model for directly investigating cell-matrix mechanical interactions by plating corneal fibroblasts transfected to express GFP-zyxin or GFP- $\alpha$ -actinin inside 3-D fibrillar collagen matrices, and performing high magnification time-lapse DIC and fluorescent imaging. This unique approach allows dynamic changes in the sub-cellular organization of cytoskeletal and adhesive proteins to be quantitatively correlated with the pattern of cell-induced matrix deformation. We have used this model to study how both biochemical and biophysical signals can be used to modulate corneal fibroblast mechanical behavior in “real-time”.