

## **The effect of selected growth factors on human anterior cruciate ligament cell interactions with a three-dimensional collagen-GAG scaffold.**

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Our work focuses on development of a collagen-glycosaminoglycan (CG) scaffold to facilitate ligament healing in the gap between the ruptured ends of the human anterior cruciate ligament (ACL). In the present investigation, we evaluated the effects of selected growth factors on human ACL cell responses important in tissue regeneration, namely cell migration, proliferation, collagen production, and expression of alpha-smooth muscle actin (SMA). **METHODS:** Explants from six human ACLs were cultured on top of a CG scaffold. Culture conditions were with either 2% FBS (control), or 2% FBS supplemented with TGF-beta1, PDGF-AB, EGF, or FGF-2. Histologic cell distribution, total DNA content, proliferation rate, rate of collagen synthesis, scaffold diameter and percentage of SMA positive cells were determined at two, three and four weeks. **RESULTS:** The addition of TGF-beta1 to the culture medium resulted in increased cell number, increased collagen production and increased expression of SMA within the scaffold. Supplementation with PDGF-AB resulted in increased cell proliferation rates within the scaffold and increased collagen production. The addition of FGF-2 resulted in increased cell proliferation rates and slowed rates of scaffold shrinkage when compared with the control group. **DISCUSSION:** This work suggests that certain growth factors can alter the biologic functions of human ACL cells in a CG scaffold implanted as a bridge at the site of an ACL rupture. Based on these findings, the addition of selected growth factors to an implantable CG scaffold may facilitate ligament healing in the gap between the ruptured ends of the human ACL.