Gene Therapy to Ameliorate Tendinopathy-Associated Symptoms and Pain

I read with great interest the recent article by Joseph et al.,1 which is appearing in this print issue of your esteemed journal. The article is highly thought provoking. Interestingly, the past few years have seen the emergence of gene therapy as a highly effective therapeutic modality for the treatment of tendinopathies.

For instance, PDGF delivered by MCM-41 mesoporous silica nanoparticles (MSN) to injured tendons greatly enhances and fastens the healing process.2 Similarly, healing in Achilles tendinopathy is significantly increased and enhanced after bone-marrow-derived mesenchymal stem-cell grafts transduced with adenovirus-carrying human TGF-beta1 cDNA.3 The remodeling of collagen matrix in the injured tendons is greatly enhanced after bone-marrow-derived mesenchymal stem-cell grafts. Similarly, the fiber bundles are much larger in the treated Achilles tendons.4

Similarly, Rickert et al.5 recently demonstrated the use of adenoviruses to deliver the growth and differentiation factor-5 gene to injured Achilles tendons. This results in increased collagen type II synthesis and accelerated healing. In vivo, the growth and differentiation factor-5 gene expression is maximal a month after initiating therapy. Similarly, animal models with Achilles tendinopathy demonstrate accentuated tensile strength after BMP-14 gene therapy,6 and exogenous vascular endothelial growth factor therapy significantly improves tensile strength in Achilles tendinopathy.7

Clearly, gene therapy provides for a unique and promising way to treat Achilles tendinopathy. I hope that the coming few years will see more studies to further assess its safety and effectiveness.

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References