Effect of Tendon-Derived Progenitor Cells on a Collagenase-Induced Model of Tendinitis in Horses

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Cell-based therapies with tendon-derived progenitor cells may be warranted in clinical cases of tendinitis. Authors’ address: Department of Veterinary Clinical Medicine, University of Illinois, 1008 West Hazelwood Drive, Urbana, IL 61802; e-mail: sdurgam2@illinois.edu. *Corresponding author. © 2011 AAEP.

1. Introduction

Tendon and ligament injuries are a common cause of lameness in performance horses. Stem cell-based treatments for tendon injuries show promise and are increasingly used. Our hypothesis was that autogenous tendon-derived progenitor cells promoted healing in a tendinitis model.

2. Materials and Methods

Collagenase-induced tendinitis was created in the superficial digital flexor tendons of the forelimbs of eight horses. Autogenous tendon-derived progenitor cells were isolated by pre-plating technique; 10 million cells were injected 4 wk post-collagenase injection, and the opposite control tendon was injected with saline. Horses were euthanized 12 wk post-treatment, and the superficial digital flexor tendons were harvested for mitochondrial RNA (mRNA), biochemical analyses, collagen and proteoglycan syntheses, and histological quantification.

3. Results

Tendon-derived progenitor cells yielded clinically relevant numbers within a short duration for autogenous treatment (mean = 21 ± 2 days). Both of the treated tendons had a significant increase in total DNA content (p = 0.021) and proteoglycan synthesis (p = 0.01) compared with a normal hindlimb tendon. mRNA expression of collagen type I (p = 0.003), collagen type III (p = 0.007), cartilage oligomeric matrix protein (COMP) (p < 0.001), and tenomodulin (p = 0.017) were significantly higher in both the treated tendons compared with the normal tendon.

4. Discussion

Collagen remodeling after tendinitis is a long-term process, and increased mRNA levels at 12 wk post-treatment may not accurately reflect the matrix synthesis during that period. Additional analyses of the protein composition and biomechanical properties are important to assess the effects of progenitor cell treatment.

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