Characterizing the Cytokine Environment in Acute Tendon Injury to Enhance Stem Cell Therapy

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A novel ultrafiltrate probe implanted within surgically created core lesions of the superficial digital flexor tendon allowed for cytokine characterization in acute tendon injury over 21 days. Inflammatory mediators peaked within 48 hours. Authors’ addresses: Department of Clinical Sciences, College of Veterinary Medicine (Koch, Berglund, Gilbertie, Ellis, Schnabel); Comparative Medicine Institute (Koch, Berglund, Gilbertie, Schnabel); Department of Molecular Biomedical Sciences, College of Veterinary Medicine (Messenger), North Carolina State University, Raleigh, NC 27606; e-mail: dwkoch@ncsu.edu. *Corresponding and presenting author. © 2021 AAEP.

1. Introduction
Tendon injury in the horse commonly affects the superficial digital flexor tendon (SDFT). Although mesenchymal stem cell (MSC) therapy has improved clinical and experimental SDFT lesions, little is known about how MSCs exert their influence in this environment. Further, the cytokine profile in acute tendon injury has been poorly characterized. In an equine model of acute tendon injury, the objective was to track the temporal change in inflammatory cytokines. The hypothesis was that these inflammatory cytokines change over time.

2. Materials and Methods
Horses (n = 7) underwent surgical induction of bilateral forelimb SDFT lesions with (n = 6) or without (n = 1) bilateral ultrafiltrate probe placement. Tendon ultrafiltrate was collected from the probes immediately postoperative and then every 12 hours for 21 days.

3. Results
Pro-inflammatory cytokines interleukin-1 beta, -6, and -8 along with fibroblast growth factor-2 were noted to peak by 48 hours. Percutaneous ultrasound-guided aspiration of control horse lesions was inconsistent and with analytes below the quantifiable level.

4. Discussion
The data support the hypothesis that a temporal change in inflammatory cytokines occurs following
acute tendon injury with peak inflammation occurring by 48 hours. Future in vitro work will examine the MSC secretome following stimulation with a cytokine profile that represents peak versus post-inflammatory tendon injury to determine if the efficacy of stem cell therapy in tendon injury can be enhanced.

**Acknowledgments**

**Funding Sources**
Grayson-Jockey Club Research Foundation, NIH 5T32OD011130-13 (DWK), and NIH 5K01OD027037-02 (AKB).

**Declaration of Ethics**
The Authors have adhered to the Principles of Veterinary Medical Ethics of the AVMA.

**Conflict of Interest**
The Authors have no conflicts of interest.