

Ex Vivo DFTS Adhesion Model To Evaluate Therapies

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This project will advance our understanding and treatment of adhesions that occur in the digital flexor tendon sheath of horses following injury and result in improved prognosis for performance.



Digital flexor tendon injuries are common in horses and can be career ending. These tendons are on the back of the leg and serve to generate motion. They are protected within a structure called the digital flexor tendon sheath which is similar to the lining of a joint and contains fluid which helps the tendons move freely. Inflammation or infection of the tendon sheath following injury often results in the formation of abnormal tissue adhesions, or bands of scar-tissue, within the tendon sheath and attached to the tendons themselves. These adhesions prevent the normal movement of tendons and result in chronic pain and loss of athletic use.

This project aims to better understand how tendon sheath adhesions form and to develop more effective ways to prevent and treat them as the current treatment options are often unsuccessful.

Our research will explore how adhesions form and test two promising anti-adhesion treatments, enalapril and tissue plasminogen activator (tPA), using a lab-based digital flexor tendon sheath model to ensure they are safe and effective. This model is the first of its kind and provides a controlled setting outside of the body to study how adhesions form and how different treatments work without live animals. This research will give a more complete picture of how adhesions form and how to stop them. It will also provide information on the best dose and number of doses when using these treatments, which is important to help veterinarians select the best treatment with the least side effects.

Overall, this research is a major step forward in improving treatment for tendon sheath injuries in horses. Our findings will be directly applicable to the clinical setting and will also be applied to future studies that will combine anti-adhesion treatments with treatments that fight infection and support tendon healing to develop treatment plans based on each horse's specific needs. This level of care will improve the quality of life for our injured equine patients and will reduce

the emotional and financial burden on horse owners, trainers, and caretakers.

Importance to the Equine Industry: Injuries of the digital flexor tendon sheath and associated deep and superficial digital flexor tendons are common in horses and carry a poor prognosis with only 36-50% of horses returning to their previous level of athletic function. Despite appropriate management and rehabilitation, this may be further complicated by the development of abnormal tissue adhesions, or bands of scar-tissue, that develop within the tendon sheath and attach to the tendons themselves. Once formed, these adhesions prevent normal motion of the tendons, leading to loss of function, chronic pain, and lameness, which can result in humane euthanasia and have a major impact on the equine industry.

This project aims to better understand how tendon sheath adhesions form and to develop more effective ways to prevent and treat them in order to improve outcomes for horses with injuries of the digital flexor tendon sheath. Such information is critical to improve the quality of life for equine athletes and reduce the financial and emotional burdens on those who care for them. Not only will our results be immediately applied to horses in the clinical setting, but they will also be used for future studies investigating combined treatments for combating infection and promoting tendon healing while also preventing adhesion formation. Collectively, this proposal will significantly advance our treatment of digital flexor tendon sheath injuries as a whole and will provide the equine industry with optimized anti-adhesion treatments and strategies.

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