

Therapeutic Use of Stem Cells for Tendon and Ligament Injuries

How Grayson-Funded Research Is Advancing the Future of Equine Regenerative Medicine

For decades, tendon and ligament injuries have been among the most frustrating diagnoses in equine medicine. Whether affecting an elite racehorse or beloved show partner, these injuries often require months of rehabilitation and carry a high risk of re-injury—even after horses appear clinically sound.



Today, regenerative medicine is changing that outlook.

Thanks in part to research funded by the Grayson-Jockey Club Research Foundation, veterinarians are gaining a far better understanding of how stem cells actually work, when they should be used, and how they may help injured tissues heal more completely.



During a Grayson Vet Chat, Dr. Lauren Schnabel (*left*) of North Carolina State University—an internationally recognized leader in regenerative medicine and a member of Grayson's Research Advisory Committee—shared how stem cell research is reshaping the future of tendon and ligament repair.

WHY TENDON INJURIES ARE SO DIFFICULT

Unlike muscles, tendons have a very limited blood supply. While this helps them withstand tremendous forces during athletic performance, it also slows healing after injury. When a tendon tears, the body often repairs it with scar tissue rather than recreating the highly organized collagen fibers that made the tendon strong in the first place. Although the horse may return to work, that scar tissue is less elastic and more prone to future injury. ***"The goal isn't simply healing," Dr. Schnabel explained. "The goal is restoring normal structure and function."***

That's where regenerative medicine enters the picture.

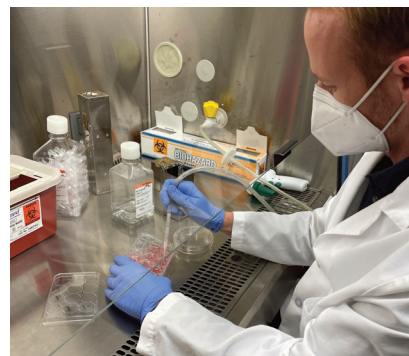
What Are Stem Cells?

Stem cells are undifferentiated cells capable of self-renewal and, under the right conditions, developing into specialized tissues.

For orthopedic injuries, veterinarians primarily use adult mesenchymal stem cells (MSCs) because they can support the repair and healing of tissues such as bone, cartilage, tendon, ligament, and muscle.

These cells are most commonly obtained from:

- Bone marrow
- Fat (adipose tissue)
- Blood-derived sources
- Umbilical cord and other neonatal tissues



How Stem Cells Work

One of the biggest advances in regenerative medicine has been understanding that stem cells don't simply replace damaged tissue. Years ago, researchers believed injected stem cells would naturally transform into new tendon cells. Today, scientists understand that their role is far more sophisticated.

Instead of becoming the tendon themselves, ***stem cells act more like biological "conductors," helping direct and support the horse's own healing response.***

They release hundreds of signaling molecules that do the following:

- Reduce excessive inflammation
- Improve blood vessel formation
- Prevent cell death
- Recruit the horse's own repair cells
- Encourage organized collagen formation
- Reduce scar tissue formation
- Promote healthier tendon remodeling

Rather than rebuilding the tendon directly, stem cells help create the ideal environment for the body to heal itself more effectively.

TIMING MATTERS

One of the major questions driving Dr. Schnabel's research was when stem cells should be administered. Historically, many veterinarians injected stem cells weeks after injury once a lesion had stabilized. Emerging evidence suggests earlier treatment may influence how inflammation develops and potentially improve long-term healing. Understanding the ideal treatment window could significantly improve clinical outcomes while helping veterinarians make evidence-based decisions about regenerative therapies.

NOT ALL STEM CELL THERAPIES ARE THE SAME

Horse owners often hear the phrase "stem cell therapy," but not all treatments are identical. Dr. Schnabel explained two common approaches.

Cultured Stem Cells

Bone marrow is collected from the horse and the stem cells are expanded in a laboratory over two to three weeks. The advantages to this include a higher number of stem cells produced with highly purified cell populations, and current extensive research supports their use. The primary disadvantage is the time required before treatment.



Bone Marrow Concentrate

Rather than culturing the cells, veterinarians can process bone marrow immediately using specialized centrifugation systems. This produces a concentrate containing:

- Stem cells
- Platelets
- Growth factors
- Other regenerative cells

Because treatment can occur immediately, bone marrow concentrate is useful when rapid intervention is desired. The tradeoff is that cell numbers are lower and the product contains a more mixed population of cells.

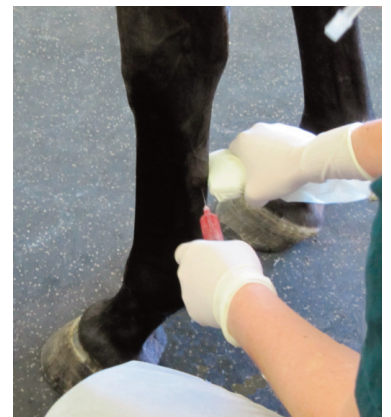
Harvesting Stem Cells

Many horse owners are surprised to learn how straightforward bone marrow collection has become. Stem cells are typically collected from the sternum while the horse stands quietly under sedation. A local anesthetic is administered, and most horses tolerate the procedure extremely well. Following collection, horses generally experience minimal discomfort and can quickly resume appropriate rehabilitation based on their original injury.

The Grayson Impact

Dr. Schnabel's work represents exactly the type of research the Grayson-Jockey Club Research Foundation was created to support. Rather than accepting regenerative medicine at face value, Grayson funds the rigorous scientific studies needed to determine *which treatments work best, when they should be used, and why they work.*

These discoveries give veterinarians the evidence needed to make informed clinical decisions while helping horse owners invest in therapies supported by science—not simply marketing. Every advance brings equine medicine closer to one ultimate goal: restoring injured horses to healthy, comfortable, athletic lives while reducing the risk of future injury. Regenerative medicine continues to evolve rapidly. As researchers better understand the biology of stem cells, future therapies may become even more targeted, personalized, and effective.



That future is being built today through research. Because every breakthrough in regenerative medicine begins with research—and every discovery brings us closer to healthier horses.



Research update from Holly White,
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