



Horse Care

ACell Therapy For Tendons and Ligaments

by HEATHER SMITH THOMAS

For many years, researchers have been looking for the signals the body uses to start the healing process when an injury occurs. When the body suffers an injury (a skin or muscle wound, pulled tendon, injured joint or broken bone, for instance), the body has to recognize the injury and then go through a series of processes to deal with it and heal. Some of the factors involved in healing include stem cells and growth factors. Insulin-like growth factor (IGF), for example, is one of the important signals in turning on certain processes within the body.

For a long time, researchers thought that the important body processes occur within the cells and that the gridwork surrounding the cells was fairly inert. Then they discovered that this three-dimensional structure outside cell walls (the matrix or scaffolding that holds cells in place) is actually a very important information highway, containing many chemicals (including growth factors) that act as mediators or messengers to tell the body what to do. A few years ago, two researchers (a veterinarian and a physician from Harvard) were able to isolate some of these factors. They found a way to extract the extra-cellular matrix and create a product they named ACell (which means not cell) that can be used as an aid in tissue healing, and started a company to produce this product.

Rick Mitchell, DVM (Fairfield Equine Associates, Newtown, Connecticut), has been using ACell treatment for several types of leg injuries in horses and is pleased with the results. The ACell product comes in a powdered form and a sheeted material, produced by the tissue engineering company formed by the two researchers who discovered the value of using this extra-cellular matrix.

Mitchell has now done more than 175 cases. "In our clinic we've been using it for lesions and abnormalities of the suspensory ligament and suspensory branches, the superficial and deep flexor tendons, as well as a few other selected tendons such as the gastrocnemius tendon in the hind leg at the hock. We have also used it for some inferior check ligament injuries. Basically, our criteria for using it has been cases with significant fiber pattern disruption, as seen on ultrasonography. In these cases we've also determined, beyond a reasonable doubt (through physical exam, nerve blocks, ultrasound, scintigraphy, radiology or whatever), that the lesion we are treating was causing lameness. So, these are the horses we've reported on," he says.

"I've been very pleased with the progress in healing of these tissues, with use of this product. I've been using it for

three years now. The ACell company approached me and my practice in the spring of 2002, asking if we thought we'd have a clinical application for this extracellular membrane. I asked them that if this bio-scaffold contains all of the growth factors and/or stimulatory peptides, then why can't we use it in some sort of granulated or powdered form and suspend it—to be injected into the injured tissues. The company was thinking initially that we might want to use it to repair lacerated tendons, but I told them we don't see that situation often enough to bother with it," says Mitchell. The number of cases for this sort of trial would be minimal.

"By contrast, the number of strained or disrupted suspensory ligaments or flexor tendons is large. They had already developed and powdered the product, because they were going to use it as a wound dressing, so we started mixing it initially with sodium hyaluronate (the sodium salt of hyaluronic acid) because it was thick and a nice vehicle for it. But later, we started using just saline because we didn't want to complicate the effects. We wanted no effects other than from the ACell product. So very early on, I started using saline with it," he says.

"The product contains a number of growth factors and other substances that are also seen in stem cell therapy and in bone marrow therapy. The beauty of ACell therapy is its simplicity; you merely reconstitute the product from a little bottle and put it in the horse's leg," explains Mitchell.

After preliminary diagnosis, confirmed with ultrasound (a week after the injury, when initial swelling has subsided, to accurately determine the exact location and severity of the injury), the horse is sedated and the reconstituted mixture is injected into the site of the injury. The mixture acts as a framework for the horse's own circulating stem cells to populate the site and become appropriate, functional tissue as the area heals, rather than scar tissue.

"The fiber patterns on tendons that I have treated, at 60 days, look similar to the fiber pattern ultrasounds that I've seen with stem cell therapy. Stem cell therapy works well, but this process works as well and does not involve having to collect the tissue to get the cells and augmenting it and having to put it back in the horse. The ACell process is also less expensive. It's not cheap, but it's a lot cheaper than stem cell therapy. Stem cells are getting a lot of press right now, but ACell therapy is just as effective. This treatment probably stimulates a stem cell response," he says.

"We know that the horse loses, at a fairly young age, the ability to regenerate tendons and ligaments. The

young horse has a limited capacity to regenerate some of this tissue—up to about 18 to 24 months of age. After that age the tendons and ligaments don't heal like they should. So this product may provide the means by which those tendons and ligaments regain some ability to regenerate," explains Mitchell.

"We've done about 175 cases and of those, more than 100 cases are more than six months out from treatment, and our overall success rate in getting horses back to original function is about 82 to 83 percent. The toughest tissues to heal are suspensory branches. The most success we've had is with proximal suspensories and superficial flexor tendons. Hind leg suspensories have done fairly well, but not as well as front suspensories. Hind suspensory success rate is more like 67 to 70 percent." This is still a very high percent of horses who heal sound enough to go back to their athletic careers, offering a lot more hope for these injuries. Many of these horses go back to a full work load without reinjuring the site of treatment.

"Right now I am trying to get the company to engage in some formal research, like a PhD project, on how this works. They need to do some serial dissections of limbs as they go along, which will require some expense and some donor horses. There has been a lot of research with this product in the dog, and rabbit, but no formal research with horses," he says.

"We are very pleased with it. I presented a paper on it at the American College of Veterinary Surgeons (October

2004), in a tendon healing seminar in which various therapies were discussed. We presented information at the British Equine Veterinary Association last September. So it's been presented and veterinarians have heard about it. The early results were so encouraging, however, that no one really believed it, and I can totally understand that," he says.

"This therapy does require some special care and maintenance. It's essential that veterinarians closely follow the protocols for use of the product and that the client is willing to provide nursing care and proper care for the horse after the treatment. Basically, this involves controlled exercise of the horse in terms of hand walking, etc., and post-injection anti-inflammatory care, such as icing and support—or hydrotherapy—to minimize the amount of reactivity that may occur," says Mitchell.

"The reactivity and inflammation is due to the fact that the product creates a profound response in the body to start the healing process. It creates an angiogenic response (formation of new blood vessels and capillaries, that grow into the tissue and help it to heal). That brings warmth and filling, and sometimes makes people nervous. This warmth and filling resolves after the tissue heals. It enhances the healing, and decreases the healing time, I believe. Use of this product probably reduces the recuperative time by about 30 percent." It is very important, however, that the rehabilitation program outlined by the veterinarian (and gradual return to use) be carefully followed. 🐾

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