A-Cell Therapy Offers Renewed Hope For Horses Incurring Tendon And Ligament Injuries

It’s hard to imagine that cells from pig bladders could be useful for healing injured horses—but, it’s true.

Heather Smith Thomas

“The beauty of A-cell therapy is its simplicity; you merely re-constitute the product from a little bottle and put it in the horse’s leg,” said Rick Mitchell DVM, of Fairfield Equine Associates in Newtown, Conn., a staunch believer in the therapy.

This image almost sounds too good to be true. But so far veterinarians who’ve been using this therapy for the past few years to treat injured ligaments and tendons have found that A-cell is a bonafide therapy that aids the horse’s own body in the healing process.

“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,” added Mitchell.

Like its close relative stem cell therapy, A-cell therapy has allowed veterinarians to add another useful tool to their belts to help sport horses return to their activities after, for example, injuring a suspensory ligament or straining a tendon.

“The fiber patterns on tendons, at 60 days after treatment, look similar to the fiber pattern ultrasounds with stem cell therapy,” said Mitchell. “Stem cell therapy works well, but this process works just as well and doesn’t involve having to collect tissue to get the stem cells, augment them and put them back into the horse. The A-cell treatment is also less expensive. It’s not cheap, but it’s a lot cheaper than stem cell therapy.”

Cooper Williams VMD, of Hampstead, Md., has been using ACell Vet Powder (UBM—urinary bladder matrix) treatments for tendon injuries in horses and is pleased with the results.

The A-cell product, which is available in powdered form and a sheeted material, is produced by a tissue engineering company by the same name. ACell Inc. is based on many years of tissue research performed by Dr. Stephen Badylak.

“The research was based on the search for the signals the body uses to initiate healing processes, in humans and animals. When we have an injury, our body must first recognize that it’s injured; then it has to go through a series of processes to deal with the injury. We know there are signals—otherwise the wound would just sit there,” said Williams.

Williams said tissue engineering is a new field, and there are three basic approaches in use.

The gene-based approach, which includes stem cells, is using cells that haven’t yet differentiated into anything, to try and heal tissues.

A second approach is the use of purified growth factor. The thought behind growth factor is that these are important in turning certain processes on within the body. This is true, but the one problem is you don’t have an on and off switch.

The third approach is scaffold-based, and this is what ACell Inc. has focused upon.

Dr. Cooper Williams has found A-cell treatment works wonders for steeplechasers who’ve injured tendons and ligaments.
“This approach uses the extra cellular matrix that surrounds the cells,” said Williams. “In tissues, there’s cellular material and also the three-dimensional support structure around the cells—the gridwork that holds them in place. For a long time, in biological research, people thought this was a fairly inert area, and that most of the important things happened inside the cells. They thought the three-dimensional structure outside the cells was mainly just for support.”

But as researchers explored what directs the body—the signals the body uses to talk to itself—they realized that the extra-cellular matrix is actually a virtual information highway, and an important one at that.

The body uses this matrix area to “talk” to itself. Otherwise, an injury wouldn’t heal, because the rest of the body wouldn’t know where it was. There are many substances that exist in that matrix, including growth factors.

“ACell Inc. was able to create a product based on this virtual information highway that can be used for tissue healing anywhere in the body,” said Williams. “Their product is derived from pig urinary bladder matrix. They remove all the cellular material and are left with the extra-cellular matrix. Bladder tissue was chosen because there’s a high percentage of extra-cellular matrix versus cellular material.”

The word A-cell, in Latin, means not cell. A is the Latin root for “not” (such as in the word asymmetrical—not symmetrical).

“By using this matrix, you’re putting into the wound a ‘mini-ecosystem.’ You’re not just putting in one growth factor [like IGF], you’re putting in all the growth factors and the inhibitors as well—the little switches that turn things on and off,” said Williams.
It's Like Magic

Dr. Steve Badylak is the driving force behind the ACell Inc. In one of his early experiments, defects of the esophagus and aorta in a dog were replaced with sheets of ACell material. The dog was re-examined after three months and it was found that these defects had healed without scar tissue. The dog had regrown a functional aorta and esophagus.

“It was difficult to tell the difference, microscopically, between the new and the original tissues,” said Williams.

The body’s typical Band-Aid in many situations is scar tissue, to fill a hole or bridge a gap. “They found that by using extra-cellular matrix products, you get healing with the tissue that was intended to be there, and in a functional manner,” he said.

The new tissue in the experimental dog, for instance, contained the blood vessels, nerves, and functional muscular layers of the esophagus in proper organized fashion.

“As part of the healing, you get abundant vascularization—new blood vessels in the area. That’s one of the amazing things that occurs with this treatment. There are certain growth factors that are involved in increasing the circulation to an area of healing, and that’s one of the big benefits,” Williams explained.

In addition to having all the attending growth factors and inhibitors, another benefit of the ACell product is its ability to attract the body’s own stem cells to an area of healing, so they can make the proper tissues. So you’re getting the stem cell treatment without having to put the stem cells in.

These factors are like traffic cops that guide everything and make sure it all goes to the right place. They bring everything into the wound that needs to be there for proper healing.

The product comes in different forms. ACell Vet Powder (UBM) can be diluted in saline, to inject into tendon and ligament injuries.

“This is the form I’m very familiar with because I was involved in the research for it,” said Williams. “They also have sheets of ACell material that can be used in wound healing and a variety of other tissue repairs. These are incredible, in helping heal wounds that are very difficult—such as open wounds, severely infected wounds and burns—without scar tissue.

“They also have a corneal disc product you can put in the eye,” he added. “ACell products can be used anywhere in the body to aid healing processes. And what’s fascinating about this is that after you place this product in the body, it’s gone within a couple of months. It becomes incorporated into the body—it becomes part of the new tissue that replaces it.”

Research Shows

Williams and several other veterinarians around the country have studied tendons and ligaments treated with the powdered A-cell material, reconstituted in saline. Between Williams and Mitchell, more than 275 horses have been treated with A-cell therapy.

“We’ve seen nothing but very positive results,” said Williams. “This is the first really exciting thing I’ve seen, for treating tendon and ligament injuries.”

Williams sees mostly steeplechase and timber horses at his practice, so he’s familiar with the many treatments touted for ligament and tendon injuries. And so far he’s been most impressed with A-cell therapy. He’s had several horses in his practice that he’s sent to Dr. Nixon at Cornell (N.Y.) for stem cell and growth factor treatments.

“He often did these two things in conjunction. But even in comparison with these, I personally have not seen anything as exciting as the ACell product, because of its dramatic healing abilities,” said Williams. “I’ve not seen anything else speed up the healing process and give better healing, like this product.”

Williams recalled one case he received three weeks after the initial injury, for a sec-

The fiber patterns on a tendon before A-cell treatment, above, and after treatment, below, where it shows marked improvement.
ond opinion. The horse had a small wound just above the back of the ankle, over the tendon. The horse was lame and had a large swelling on the tendon, all the way up to the knee.

After scanning the tendon, Williams found the superficial flexor tendon had a dissecting septic tendonitis that went from the ankle all the way to the knee. Even though it was just a tiny wound, infection had spread into the tendon.

“The tendon was four times normal size, with an appearance similar to Swiss cheese, on ultrasound,” he said. “Many horses with this problem end up being euthanized because they typically don’t heal well.”

Williams consulted with Badylak. ACell therapy was still in the research stage, and because this was such a challenging case, Badylak was interested in helping. And because ACell products are antibacterial, it was an added benefit.

“I ended up putting a double dose of the ACell material up and down through the tendon because there was so much tissue involved,” said Williams. “I could not believe the amount of healing that took place within the first month. It cleared the infection, and by the second month you could barely tell there’d been any tendon damage at all, let alone infection. There was a tremendous amount of healing and it had all filled in with proper tissue.

“The horse became sound very quickly,” he said. “And now, he’s back to doing good work again, without any problems.”

Williams treated a number of horses last year that are now in their timber, steeplechase and flat racing season, and back in competition. “Several are running again and winning races, without their legs showing any adverse problems at all,” he said.