Stem cell therapy – from much-loved ponies to million-pound racehorses, the best solution for a tendon injury

writes Lucy Graham of VetCell

Stem cells seem to be in the news all the time at the moment, and that's not without good reason. They have the remarkable ability to differentiate, which means they can develop into many different types of cell. This is what happens as an embryo forms into a foetus and starts to grow. Because of this ability, stem cells can also be used to regenerate damaged or diseased tissue.

In horses, stem cells taken from the horse's own bone marrow have been used to treat tendon injuries for the last eight years. This avoids the need for any embryonic stem cells, which are highly controversial to use for obvious reasons. Initially it was just racehorses that underwent stem cell therapy but now around half of horses treated are non-racehorses and include eventers, dressage horses, polo ponies, hunters, all-rounders and even native ponies. But why do horses and ponies sustain tendon injuries in the first place?

In horses, as in humans, tendon and ligament injury can occur due to a repetitive strain injury (RSI) or from direct trauma. When you see the extent to which a tendon stretches during galloping and during take-off and landing over a fence you can understand how an RSI type problem can occur. Under normal circumstances, the horse's fetlock joints both front and hind will virtually touch the ground at the point of take-off over a fence, as the horse pushes down with the front end, lifts its shoulders and transfers its weight onto the hind end to push off the ground. The same is true on landing as the forelimbs take the strain.

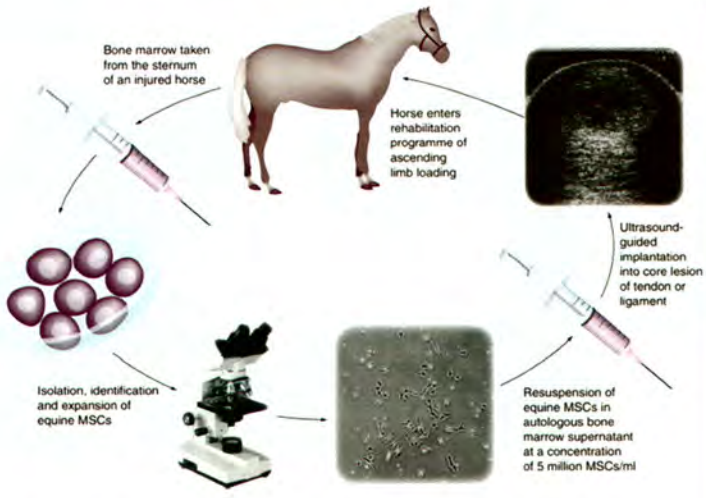
Cell Implantation: After they have been cultured in the lab, the stem cells are returned to the vet for implantation into the tendon

This force on the tendon has been measured at one tonne per square centimetre of tendon, both when jumping and also when at a full gallop (bear in mind that the SDFT is actually only one square centimetre in cross-sectional area!). It has also been shown, under lab conditions, that the SDFT breaks when one tonne of stretching force is applied to it. This therefore means that the tendon is close to breaking point whenever the horse is galloping or jumping.

Recent research (by Professor Roger Smith at the Royal Veterinary College) has shown that racehorses treated with VetCell's StemRegen stem cell therapy have half the rate of re-injury (27%) of those treated with conventional therapies (57%). The research also showed that the tendons treated with stem cell therapy were more normalised in structure and function than those treated with other methods. Full details of this research are available on the VetCell website if you are interested in finding out more (http://www.vetcell.com/latest-stemregen-research/).

As well as the hundreds of racehorses that have been treated and returned to racing (with lots of multiple winners!) there have been many successes with less high-profile equine athletes. Riding Club all-rounder and novice eventer Zoe, had only been in her new home for six weeks, when she suffered a 30% tear to her deep digital flexor tendon whilst messing about in the field.

Her owner, Gail, takes up the story: "We were given several options of treatment but the vet felt that as it was such a new injury, and so large a tear, that stem cell therapy would be the best way to treat her, to give her a good chance of returning to full work and staying sound. After stem cell implantation and the year-long rehabilitation she came back to full fitness and



Above: – VetCell's StemRegen stem cell therapy process

won her first 2-day-event. Her scan results showed that the tendon had healed and there was no sign of damage. I would thoroughly recommend stem cell therapy as a treatment, as I feel it gives a much stronger repair to the tendon."

It's not just tendon injuries that can benefit from stem cells. A 6-year-old Welsh Section D gelding with a stifle injury has benefitted from stem cell therapy in recent months. He had a split in the cartilage in his stifle and a partial rupture of the caudal cruciate ligament. Following stem cell implantation into the joint he is now doing very well and his vet is extremely pleased with his progress so far. Other native breeds treated in the last year include Dales, Connemara, New Forest and a Welsh X Shire, as well as pony crosses with unspecified breeding.

During the culture process the cells are examined regularly to check their progress.

Stem cell therapy really has become available to everyone, particularly now that nearly all insurance companies will cover it under their normal vets fees cover. The process itself is also not as daunting as people might think and therefore that might explain why it is increasing in popularity across all areas of equestrianism and all breeds. So what's involved?

A bone marrow sample is taken from the horse's sternum or tuber coxa (hip bone) under-standing sedation and using a specially designed needle. This is then sent to an authorised equine stem cell centre (laboratory) where the stem cells are separated out and cultured over a period of two to three weeks to increase their numbers. The stem cells are then returned to the vet who injects them directly into the site of injury, again understanding sedation and using an ultrasound scanner to guide the needle. Following this treatment the horse undergoes a year of controlled exercise to rehabilitate back to full fitness. This rehabilitation period gives the stem cells the best chance of repairing the tendon back to a state where it can sustain the demands of racing, hunting or competition.

A microscope image showing the stem cells when they are ready to be dispatched

Vets wishing to learn how to perform a bone marrow aspiration or stem cell implantation can attend training courses held at the Royal Veterinary College or VetCell can arrange for an experienced vet to come out and assist with a particular case. For anyone wanting to find out more the VetCell website (www.vetcell.com) has research papers, testimonials, copies of media coverage and a list of vets who are already trained in the procedures. You can also contact VetCell direct if you have any queries or questions regarding stem cell therapy (full contact details are on the website).

VetCell

Reducing the risk of laminitis

Although stereotypically related to fat ponies, laminitis can attack any horse at any time, and is getting more and more common. While some causes of laminitis are harder to avoid, nutritionally induced laminitis is the easiest to prevent.

With the following tips you may be able to reduce the risk:

- **Provide an alternative source of forage** for the stabled horse. Overnight soaked hay, Timothy hay or late cut haylage or in some situations good quality straw are appropriate sources of forage although analysis is recommended. Or you could use a low calorie, short chop product to increase eating time. Look for the Laminitis Trust symbol, which means a product can be used as a partial or complete forage replacer.
- **Restrict grazing** as necessary, by turning out in small paddock or by using a grazing muzzle. This means the amount of time your horse spends in the field may not have to be compromised, resulting in a more natural, healthy life style and a slimmer, happier horse.
- **Don't feed cereals** or a cereal mix to horses prone to laminitis. Always check the starch level – anything over 15% starch should be avoided - nutritional management is key in the prevention of laminitis.
- **Don't starve** the horse or pony. This can lead to a condition called hyperlipaemia, which is very serious and can be fatal.
- **Do not allow the horse or pony to become fat.** Whilst they need a covering and should not be ribby or bony, keep an eye out for fatty deposits on the ribs and hind quarters, and look for signs such as a cresty neck- these are all warning signs that all may not be well.
- **Where laminitis is suspected, ALWAYS call the vet.** Laminitis is simply treated if caught early and monitored closely, but leaving it a day too late can cause the pedal bone to rotate which can be extremely serious. Laminitis is extremely painful and debilitating, and the vet can prescribe pain killers to help ease discomfort

SPILLERS HAPPY HOOF® is a specially blended short-chop forage which can be used as a complete feed. It is designed to extend eating time and was the first complete chopped fibre feed to be approved by the Laminitis Trust. For friendly advice about feeding horses and ponies prone to laminitis contact the SPILLERS.

Care-Line on 01908 226626 or careline@spillers-feeds.com