

# Tendon injuries: the future

The Horserace Betting Levy Board (HBLB) spends a third of its annual veterinary research budget on prevention and treatment of musculoskeletal injury and disease. Because tendon and ligament injuries are common in racehorses, these are a major focus — how is this helping horses of all types?

**B**RITISH Racing is committed to providing the best possible standards of veterinary care for its horses and has invested, via the HBLB, over £23m in veterinary research and education since 2000. Tendon and ligament injuries are the most common injury to National Hunt horses but also occur in all equines from Pony Clubbers to polo ponies.

The most common site of tendon injury is the superficial digital flexor tendon (SDFT). This runs down the back of the leg from a muscle above the knee to the pastern and is an important weight-bearing structure.

Throughout the past 50 years, HBLB researchers have led the field in scientific investigations aimed at understanding why the tendon fails, how injuries can be prevented and the best way to treat and rehabilitate horses that do suffer from tendon injuries.

## The problem

TENDON injury is most likely influenced by both nature (in the form of the horse's genetic makeup), nurture (in the form of specific factors that it is exposed to during training and competition such as speed, distance and surface).

Attempts to understand these factors have been an important underlying driver behind much HBLB-funded research over the past five decades.

With HBLB funding, Professor James Wood of Cambridge Veterinary School has shown that risk factors for tendon and ligament injury are increasing age,



Tendon problems are the most common source of injury in National Hunt horses, although any type of horse can be affected

Far right: the arrow shows the most common site of tendon injury — the superficial digital flexor tendon. Right: stem cells being injected into a tendon

increasing race distance and specific training facilities.

But interestingly, cumulative gallop distance and number of days spent in jump schooling did not affect the odds of tendon and ligament injury.

A recent study performed by Dr Lucinda Tully at the Royal Veterinary College, University of London, has shown that genetic make-up can contribute to the risk of SDFT injuries. Two specific genes were linked to tendonitis and one of these protected horses from injury.

This study will pave the way towards understanding how genetic risk factors interlink with environmental factors and contribute to injury.

## Treatment options

WHEN tendon is damaged it forms scar tissue within the injury site. This scar tissue is weaker than healthy tendon and therefore tends to be damaged repetitively when attempts are made to train the horse again.

With HBLB funding, Professor Roger Smith and Dr Godwin of the Royal Veterinary College have shown that in National Hunt racehorses with SDFT injury, stem cell therapy reduced the re-injury rate to around 26%, whereas in older studies of similar horses treated in other ways it was 50-55%.

Adult stem cells are harvested



from the injured horse's own bone marrow but can also be collected from the umbilical cord at the time of birth, with no harm to the foal. These cells are known as "embryonic" cells because they have been made by the foal prior to birth.

HBLB funding has enabled Dr Debbie Guest of the Animal Health Trust to show that the embryonic cells were able to migrate to other injury sites in the tendon, whereas adult stem cells stayed near to the injection site.

Fascinatingly, embryonic cells were not rejected when injected into horses unrelated to the foal from which they were derived.

This means that in future it may be possible to store stem cells ready for use as soon as a tendon injury occurs.

## The future

FURTHER HBLB funded initiatives on the go include:

- Scientists at the Royal Veterinary College are developing novel tools to investigate cellular treatments for tendon injury.
- Dr Chavaunne Thorpe working in Professor Peter Clegg's and Dr Hazel Screen's laboratory at University of Liverpool and Queen

Mary, University of London has just won a prestigious international young investigator award, the Savio L-Y Woo award, for her work on tendon biomechanics.

► The Clegg/Screen group combine cutting edge engineering and molecular approaches to study fatigue damage within the equine tendon.

► Professor Janet Patterson-Kane, University of Glasgow is researching how tendon proteins and stiffness modify the tendon cells.

► Together, these projects will help UK veterinary scientists towards the HBLB's goal of reducing the impact of tendon injury in horses at all competition levels. H&H



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