EQUINE REGENERATIVE MEDICINE

By Andy Bathe

Regenerative medicine is an exciting and emerging field in the treatment of equine orthopaedic injuries. It tries to mimic the processes that occur during embryonic development when tissues are formed from stem cells. Its aim is healing of the injured tissues back to original quality, ideally without any scar formation and with healing being in an efficient fashion.

Some tissues in the body have excellent powers of repair, such as bone. Others, such as tendons and cartilage have limited abilities to heal fully. Standard therapies involve around anti-inflammatory therapy, rest and controlled exercise to give the body a chance to heal itself. While regenerative medicine offers hope for a better long term outcome, there is still a huge amount of ‘type 2 diabetes’ surrounding it and a strong base of evidence needs to be collected in humans as well as horses.

What is regenerative medicine?

The basic principles of any regenerative medicine are to try and provide a scaffold to repair, to provide cells for the healing process and to provide growth factors to stimulate the healing process. The table outlines the list of common names and acronyms that are frequently used by veterinary surgeons and others in the veterinary and pharmaceutical industries. Stem cells are the archetypal model for regenerative medicine, with the original thought being that the cells would differentiate into any type of tissue. For this reason, when injected into a tendon they would produce new tendon cells. Whilst this may be true to a small degree, it is also possible that they just act as a scaffold for healing and do not produce new tendon cells. The normal place for harvesting them is from the sternum, but there are some other places such as bone. Others, such as tendons and cartilage have limited abilities to heal fully. Standard therapies involve anti-inflammatory therapy, rest and controlled exercise to give the body a chance to heal itself. While regenerative medicine offers hope for a better long term outcome, there is still a huge amount of ‘type 2 diabetes’ surrounding it and a strong base of evidence needs to be collected in humans as well as horses.

Injury and repair

In this section, we will look at some key examples of how regenerative medicine is used in practice today.

Direct bone cells

Bone marrow-derived cells, or BMSCs, are harvested from bone marrow aspirates and can be used to repair bone defects. They are often used to repair defects in the lower limb, such as bone fractures. The BMSCs are isolated from the bone marrow aspirate and cultured in vitro. The cultured BMSCs are then injected into the bone defect to promote bone repair.

Platelet-rich plasma therapy (PRP)

PRP therapy involves taking blood from the horse, which is then centrifuged to separate the platelets from the plasma. The platelets are then injected into the area of injury to promote healing. PRP therapy is often used to treat tendon injuries and is currently the treatment of choice for PRP is obtained by processing a simple blood sample to produce a scaffold for the healing process and to provide growth factors to stimulate the healing process. The normal place for harvesting them is from the sternum, but there are some other places such as bone. Others, such as tendons and cartilage have limited abilities to heal fully. Standard therapies involve anti-inflammatory therapy, rest and controlled exercise to give the body a chance to heal itself. While regenerative medicine offers hope for a better long term outcome, there is still a huge amount of ‘type 2 diabetes’ surrounding it and a strong base of evidence needs to be collected in humans as well as horses.

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