

# Platelet-Rich Plasma

Learn what this novel “regenerative therapy” can do for your horse

Regenerative medicine describes a group of techniques that uses the body’s natural ability to heal. Stem cell therapy, autologous conditioned serum, and platelet-rich plasma (PRP) are all different types of regenerative medicine.<sup>1</sup> Each of these therapies uses biologic samples (e.g., cells or platelets) taken from a sick or injured horse and processes them to behave in a certain way (e.g., concentrate them, stimulate them to become a certain cell type, or produce a certain protein). These “modified” biologic products are then injected into or applied to the horse from which the sample was originally collected to treat a specific injury. Thus, these therapies are referred to as “autologous” because the patient is being treated with a product derived from his or her own body. Autologous therapies are safe and associated with minimal side effects.

Regenerative medicine is one of the most recent and potentially helpful therapies introduced to the equine industry over the last several years. Several conferences have focused on regenerative medicine and many of the Veterinary Hospitals at universities throughout North America have laboratories dedicated to studying stem cells, autologous conditioned serum, and PRP.<sup>2</sup> However, regenerative medicine remains in its infancy, leaving many of us unsure exactly what it is and how best to use it. This fact sheet will explain what PRP is, how it is made, and how this technology can potentially help your horse.

## What are Platelets?

There are three main types of cells in blood circulation: red blood cells; white blood cells; and platelets. Technically, because platelets do not have a nucleus (the part of the cell that contains DNA), they are referred to as “cell fragments.” Like the red and white blood cells, platelets (also called thrombocytes) are produced



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Indications for PRP use in horses include tendon and ligament injuries, wound healing, and osteoarthritis treatment (shown).

in the blood marrow. After they mature, platelets are released into the circulation where they play a prominent role in blood clotting (hemostasis). As such, platelets are filled with beneficial growth factors that help repair connective tissues and keep them healthy. These growth factors include platelet-derived growth factor, transforming growth factor beta, fibroblast growth factor, insulin-like growth factor 1, and vascular endothelial growth factor.<sup>2</sup>

## What is PRP and How is it Made?

By definition, PRP is a plasma sample with platelet concentration above baseline levels.<sup>1</sup> Often, PRP produced using stall-side systems can produce a plasma sample with an even higher platelet level.

PRP can be made using a number of commercially available systems. In general, all of the systems use the same basic components and principle. A blood sample

is collected from the patient in special tubes and the platelets are concentrated—most commonly through centrifugation. During this process the tubes filled with the horse’s blood are spun, physically separating a majority of the red and white blood cells from the platelets and plasma, thus forming a platelet-rich plasma.

The system chosen for concentrating the platelets must be used according to the manufacturer’s recommendations. This ensures the growth factors are not released from the platelets prematurely, before they are used on the patient. It is also imperative to consider bacterial contamination while preparing the PRP. One study published in a 2010 edition of the *Equine Veterinary Journal* found that uncontaminated PRP could be produced in a clean laboratory environment (i.e., they did not test any of the stall-side methods of making PRP), but noted that it is essential to perform the procedure following strict aseptic technique.<sup>3</sup>

## PRP Use in Horses

In human medicine, PRP is made using the same principles and is used to treat various medical conditions such as nerve, tendon, and myocardial (heart muscle) injury, bone repair and regeneration, cosmetic procedures, and dental health. The major indications for PRP in horses are musculoskeletal conditions and wounds, as described here:

**PRP for Tendons and Ligaments** Tendons are notoriously slow to heal, and horses frequently reinjure the tendon at the same site. PRP is believed to stimulate tendon injury repair. To date, several studies have reported beneficial effects of PRP for the treatment of superficial digital flexor tendon injuries (both acute and chronic cases) and suspensory ligament injuries.<sup>4</sup> Theoretically, other types of tendon and ligament injuries could also be treated. Some

studies report only a single treatment is needed to help repair the defect whereas other researchers recommend multiple injections over several weeks.

**PRP for Joints** PRP also can be injected directly into a joint (i.e., intra-articularly) to treat osteoarthritis (OA). Several human clinical studies support using PRP to treat arthritis, but no data on PRP in horses with osteoarthritis has yet been published in a peer-reviewed journal.<sup>1</sup> So far, only preliminary data has been presented at various conferences. For example, one group of scientists from Spain presented their data at the 11th International Congress of the World Equine Veterinary Association in 2009.<sup>5</sup> Researchers injected PRP 1-3 times into the joints of 30 horses with naturally occurring OA and compared their post-treatment lameness and athletic function to that of 12 untreated (control) horses with OA.

**PRP for Wounds** PRP also has been hypothesized to help improve wound healing. In horses, wound healing, after surgery or an injury, for example, can be slow, and in some cases "proud flesh" can develop. One of the two published studies on PRP

for wound healing in horses found that treated wounds healed faster than wounds that were simply sutured (stitched) closed. The second study did not find any benefit of PRP on wound healing using a specific, surgically-created defect; however, those authors did suggest that other wounds might benefit from PRP.<sup>6</sup>

### Future Directions

As exciting as the field of regenerative medicine is, experts advise keeping our enthusiasm in check. All regenerative therapies, including PRP, are in their infancy, and the current body of knowledge about these therapies remains rather limited. Variations in systems used to prepare a high-quality biological sample, timelines on when, where, and how much to administer, and post-treatment rehabilitation and prognoses remain to be clearly established.

Research is being conducted aggressively and progress in this field is rapid. The most up-to-date information on these promising and important technologies is available by searching websites such as PubMed, the International Veterinary

Information System, and TheHorse.com. Each of these resources is available free to horse owners. 🐾

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