



# Platelet Rich Plasma Therapy

## for the Canine Athlete

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Photos courtesy of VOSM except where noted

The use of regenerative medicine has become increasingly popular in both human and veterinary medicine for multiple disease processes. Platelet rich plasma (PRP) is a regenerative medicine therapy that is believed to aid in tissue healing. While PRP's first clinical applications were limited to dentistry and maxillofacial surgery to improve bone healing, PRP presently has much broader clinical applications, extending to orthopedic surgery and sports medicine. PRP is currently used in both people and animals to help with healing in numerous tissues. Recent studies have shown PRP to be efficacious in managing numerous orthopedic conditions, including osteoarthritis and soft tissue injuries (tendon and ligament injuries).

### What Is Platelet Rich Plasma Therapy?

Platelets are cells that circulate in the blood stream and play roles in both hemostasis (clotting of blood) and wound healing. Platelets contain two types of granules. The first type increases permeability of blood vessels to allow for access of inflammatory cells to the site of damage and contributes to blood clot formation. The second type of granule releases growth factors that stimulate other cells of the body to migrate to the area of trauma, thus facilitating tissue healing. It is the growth factors contained within the platelets that are of significance for tissue healing. These growth factors include

platelet-derived growth factor (PDGF), transforming growth factor- $\beta$ 1 (TGF- $\beta$ 1), transforming growth factor- $\beta$ 2 (TGF- $\beta$ 2), vascular endothelial growth factor (VEGF), basic fibroblastic growth factor (bFGF), and epidermal growth factor (EGF). Many of these growth factors have been shown in recent studies to promote cartilage health and counteract the cartilage breakdown that is associated with osteoarthritis. Platelets have also been shown to recruit and activate stem cells.

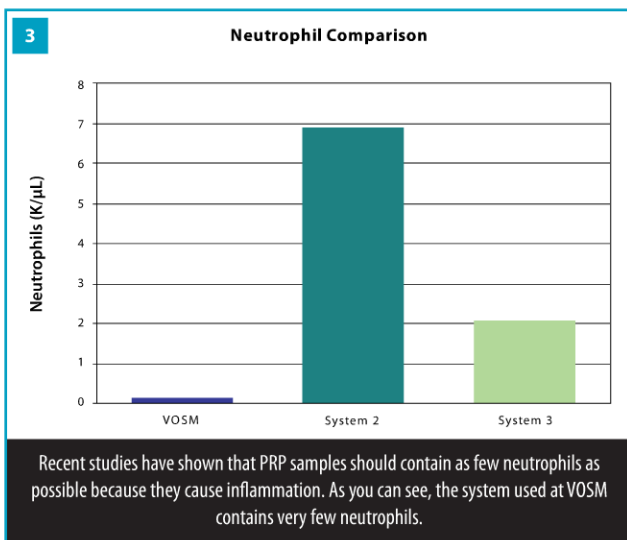
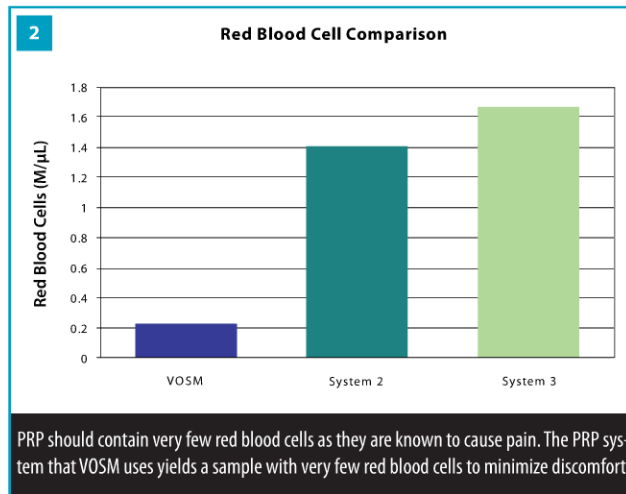
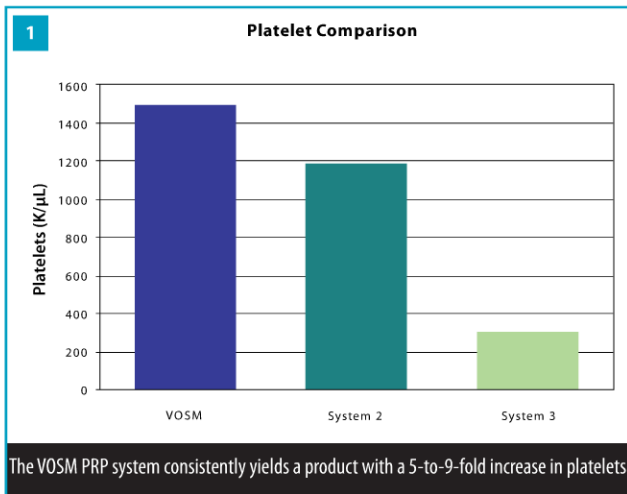
PRP is an autogenous (self-derived) fluid concentrate composed primarily of platelets and growth factors. On average dogs have 200,000 to 500,000 platelets per microliter. PRP is made by processing a patient's own blood sample. The goal is to obtain the highest concentration of platelets and growth factors, while removing the other components of the blood such as the red and white blood cells, which can cause pain and inflammation. To make PRP, a sample of blood is obtained from the patient, mixed with an anticoagulant, and processed either manually by spinning it in a centrifuge to separate its components (centrifugation) or through an automated system. This process concentrates the platelets as well as growth factors, amplifying healing properties.

There are many commercial systems available to concentrate platelets. At Veterinary Orthopedic and Sports Medicine Group (VOSM) we have performed a prospective analysis of the commercial systems available to determine which system achieves the highest platelet concentration with few red and white blood cells. The systems used at VOSM is not only validated for use in dogs but also yields platelet counts 5 to 9 times above normal, with minimal red and white blood cells in the product. See [Figures 1 through 3](#).

### PRP for the Agility Dog

Over the past 15 years, PRP has been used in both human and equine athletes to either manage osteoarthritis or treat soft tissue injuries. Recently, PRP has become available for canine athletes. Preliminary studies have shown favorable results. PRP can help athletes maintain fitness and comfort during the competition season and also help return athletes to full function in the event of an injury. A full sports medicine evaluation should be performed by a canine sports medicine specialist to determine if a dog is a candidate for PRP therapy.

PRP therapy is often performed as a series of 1 to 3 injections with 2 weeks between each injection. If PRP is being used to manage moderate to severe osteoarthritis, about 50% of dogs require more than one injection for significant improvement. PRP therapy is a minimally invasive procedure that typically can be performed on an outpatient basis.



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Approximately 30 to 60 milliliters of blood is obtained, processed, and prepared for injection (see [Figures 4 and 5](#)). Once the PRP is processed, the area that is to be treated is clipped and aseptically prepared (see [Figure 6](#)). Sedation or general anesthesia may be required, depending on the location of the injection. For osteoarthritis, PRP joint injections are usually performed without sedation; however, some joints such as the hip require sedation and may also require advanced imaging (fluoroscopy) for guidance. For soft tissue injuries, ultrasound guidance is used to ensure accuracy of the injection as PRP is most effective when administered directly into the site of injury (see [Figure 7](#)). Sedation is often required. Please be sure to talk with your canine sports medicine specialist regarding all details of the procedure.

The most common side effect is discomfort associated with the injection, which typically resolves within 12 to 24 hours of the injection. Mild discomfort in the first 24 to 72 hours following the injection and can be managed with cold compressing and pain medication prescribed by your canine sports medicine specialist if needed. Non-steroidal anti-inflammatory medication and steroids are avoided during the post-injection period unless there is inflammation (joint flare) following the injection. Also, a dedicated conditioning program is often recommended in conjunction with PRP therapy to achieve and maintain the fullest musculoskeletal potential and performance level. 🐾

## References

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4 Dr. Carr processing PRP in the regenerative medicine laboratory at VOSM.



5 The final PRP product contains multiple growth factors to support healing.



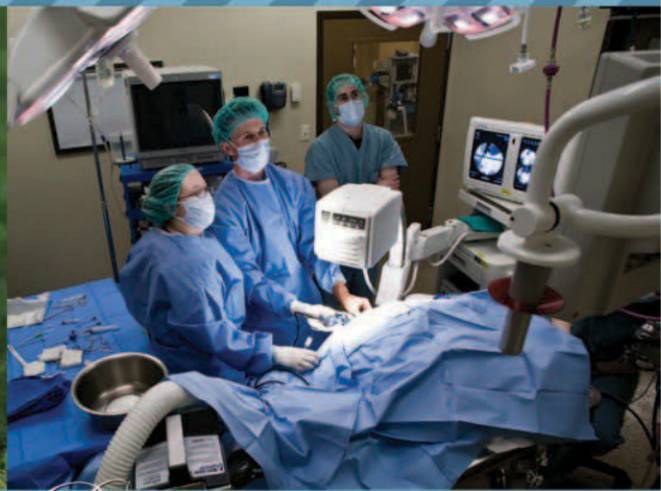
6 An intra-articular injection of PRP to help manage stifle osteoarthritis.



7 An ultrasound guided injection of PRP for soft tissue injury.

Dr. Sherman O. Canapp, Jr. completed a combined Doctor of Veterinary Medicine/Master of Science at Kansas State University, an internship in small animal medicine and surgery at the University of Missouri, and followed up with a three-year residency in small animal surgery at the University of Florida. Dr. Canapp currently practices orthopedic surgery and sports medicine at Veterinary Orthopedic & Sports Medicine Group in Annapolis Junction, Maryland, where he is chief of staff. Dr. Canapp has earned diplomate status from both the American College of Veterinary Surgeons and the American College of Veterinary Sports Medicine and Rehabilitation. His primary focus and research is in arthroscopy, regenerative medicine, and sports medicine. Dr. Canapp lectures nationally and internationally and is a consultant for numerous organizations and medical companies.

Dr. Brittany Jean Carr is currently a rehabilitation therapist and American College of Veterinary Sports Medicine and Rehabilitation resident at Veterinary Orthopedic and Sports Medicine Group (VOSM) in Annapolis Junction, Maryland. She earned her B.S. in biology from Furman University in Greenville, South Carolina. She then attended the Virginia-Maryland Regional College of Veterinary Medicine at Virginia Tech in Blacksburg, Virginia. During her time in veterinary school, she served as president of the student chapter of the American Veterinary Medical Association and was honored with the College of Veterinary Medicine Outstanding Senior Award. After earning her DVM, Dr. Carr completed a small animal rotating internship at the Animal Specialty Group in Los Angeles, California and surgical internship at VOSM. Dr. Carr's research studies include objective gait analysis, regenerative medicine, and return to sport following cranial cruciate ligament injuries.



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