ACP Max™ System

Platelet-Rich Plasma

Arthrex®
Vet Systems

ACP Max™ Syringe System

Features and Benefits

For the safe and rapid preparation of platelet-rich plasma (PRP)
Autologous blood products have become increasingly popular in a number of orthopedic therapies. One of these, PRP, is beneficial because it may release growth factors that may result in a healing response.

- The ACP Max system for autologous conditioned plasma (ACP) allows for rapid and efficient concentration of platelets and growth factors from autologous blood for use at the treatment site
- As the entire preparation process takes place in a closed system, this unique device allows for convenient and safe handling
- More affordable, easier to use, and with a faster processing time than other conventional PRP devices[1]
- White blood cells, specifically neutrophils, are NOT concentrated within the ACP Max system. These cells can have a detrimental effect on the healing process due to release of degradative proteins and reactive oxygen species[2,3]

Ordering Information

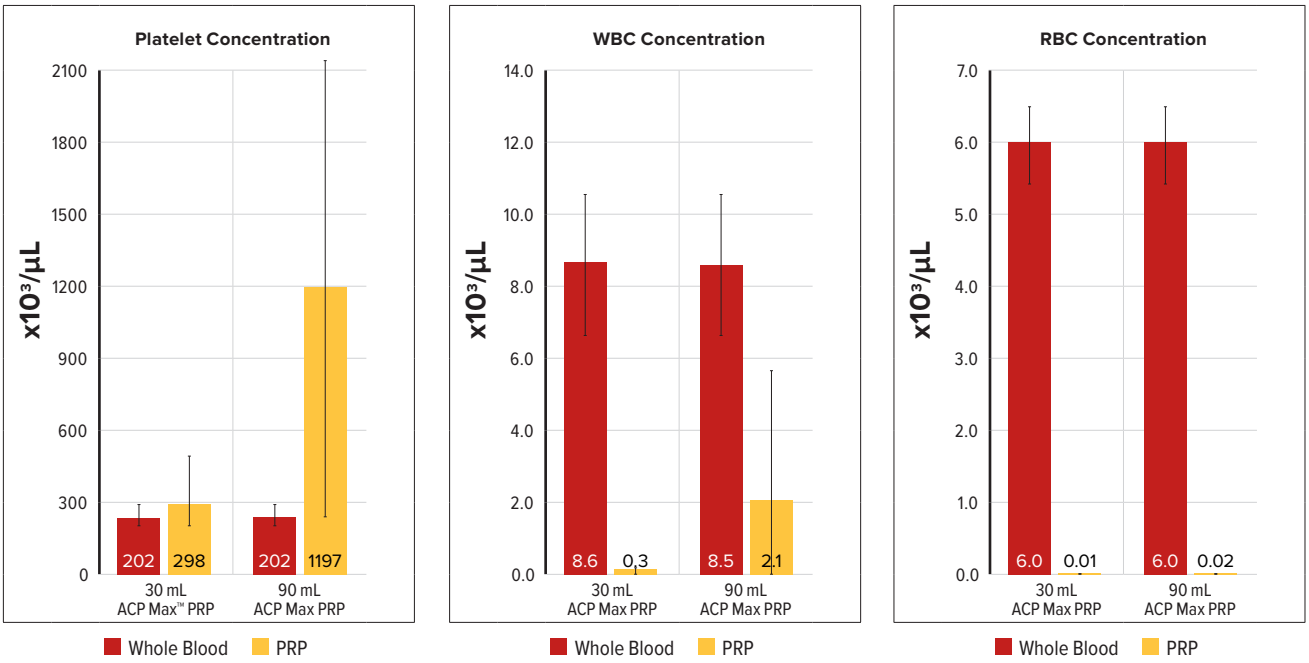
Product Description	Item Number
Centrifuge, HORIZON™ 24-Flex-AV, w/ rotor	00389-129-**001K**
ACP Max PRP System, w/ ACD-A	VABS-**10015**
ACP Max PRP System, w/o ACD-A	VABS-**10013**
ACP Max Counterbalance	VABS-**10017**
ACP Double-Syringe Counterbalance	ABS-**10027**
Centrifuge, Hettich® Rotorfix 32A, w/o rotor	1206-**33**
Swing-Out Rotor, 4× 100 ml buckets w/ covers	VAR-**1261**
Hettich ACP Max Bucket	**1490**

Mechanism of Action

Outside the bloodstream, platelets become activated and release proliferative and morphogenic proteins. They appear to work synergistically to invoke the following benefits[4-6]:

- Induce proliferation and differentiation of various cell types (eg, progenitor cells, osteoblasts, epidermal cells)
- Enhance / modulate production of collagen, proteoglycans, and tissue inhibitor of metalloproteinases (TIMP)
- Stimulate angiogenesis and chemotaxis

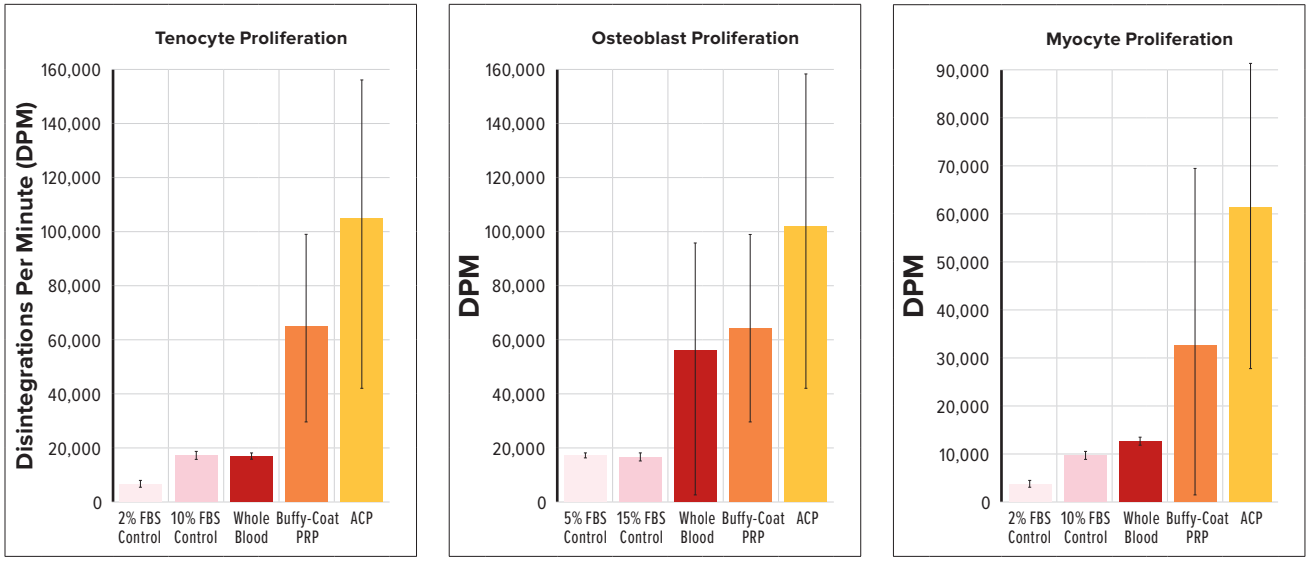
In order to evaluate the differences between ACP and whole blood, ACP was prepared from the venous blood of 20 healthy donors. The concentrations of platelets, red blood cells (RBCs), and white blood cells (WBCs) were measured with a standard complete blood cell count. Density of platelets was more than twice as high in the ACP versus whole blood.[7] Additionally, there was an average reduction of 80% WBCs (specifically, 99.9% reduction of neutrophils) and 99.4% RBCs.



To determine the effect ACP has on particular cell lines, in vitro culture work was done with human tenocytes, osteoblasts, and myocytes.

Peripheral blood was obtained from 8 donors and proliferation of the cell lines was measured for five culture groups: negative control, cells cultured with 2% or 5% fetal bovine serum (FBS); positive/proliferative control, cells cultured with 10% or 15% FBS; whole blood; a buffy–coat-based PRP system containing 7× platelet concentration and 4× WBC concentration; and ACP.

An ANOVA statistical analysis was completed to compare the different culture groups. ACP resulted in an increase in proliferation that was statistically significant ($P < .05$) over the negative control, positive control, and whole blood culture groups for each of the three cell lines. ACP-induced proliferation was also statistically greater than the buffy–coat-base PRP culture group for the osteoblast and myocyte cell lines. ACP was not statistically different from the buffy coat PRP for tenoctyes, but it did approach significance and had an increased proliferative mean.[8]



ACP's increased proliferation could be caused by a number of factors. There may be a cellular dose response indicating that only a certain level of growth factors released from platelets is needed in order to elicit maximum proliferation. After reaching this proposed threshold, over concentrating platelets and growth factors may cause a paradoxical inhibitory effect on cell proliferation.[9,10]

The inclusion of WBCs, specifically neutrophils, within a PRP product may prevent maximal growth potential due to release of degradative enzymes and reactive oxygen species.[2,3] Overall, this in vitro study demonstrates that ACP is the ideal PRP for cellular proliferation when compared to a buffy–coat-based PRP.

Directions for Use

1

After opening box, remove upper ACP Max™ tray and set aside.

2

Prepare blood draw supplies and vial adaptor on 30 mL vial of ACD-A. Withdraw 13.3% (4 mL) ACD-A into 30 mL syringe.

3

Using appropriate PPE, draw the desired amount of blood for processing. Cap the syringe when finished.

4

Open the sterile tray and remove the ACP Max syringe and guide. Express air out of the syringe by depressing the syringe guide.

Seat the ACP Max™ syringe on the red cap of the tray and turn clockwise to cap. Pull up to remove.

Remove the cap from the syringe containing blood. Connect the syringe to the blue port of the ACP Max and slowly fill. Remove the syringe, followed by the syringe guide, by turning counterclockwise.

Open centrifuge lid. Place ACP Max counterweight. Ensure counterweight volume matches the volume of blood to be processed. Place ACP Max syringe opposite the counterweight. Set to 3400 rpm and set spin time according to volume (30 mL = 3 minutes; 60 mL = 6 minutes; 90 mL = 9 minutes).

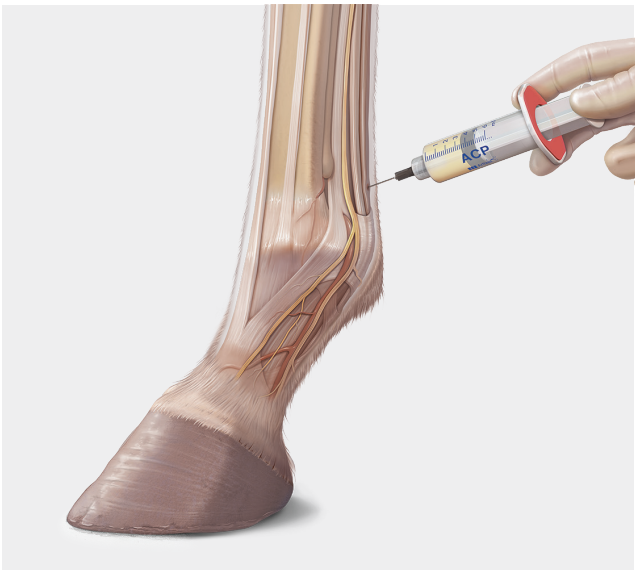
Remove from centrifuge carefully to avoid mixing the sample. Replace syringe guide by turning clockwise, then attach 30 mL syringe from the sterile layer.

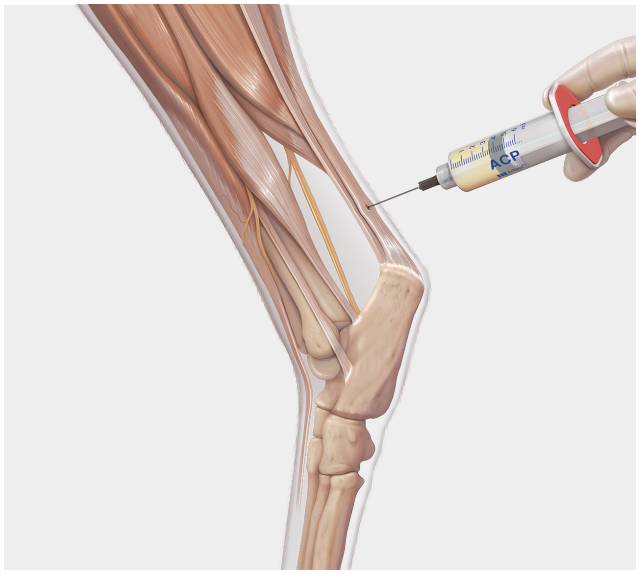
Using the 30 mL syringe from the sterile layer, withdraw the PPP until the plunger is 3 “tick marks” above the buffy coat / RBC interface. Next, place the ACP syringe and fill to full volume (15 mL) by pulling up on the red tabs. Remove ACP syringe and cap with remaining red cap.

Mix the sample by gently inverting the ACP double syringe for 15 to 30 seconds. Place sample in centrifuge. Ensure appropriate counterweight and bucket spacers are in place. Spin at 1500 rpm for 5 minutes.

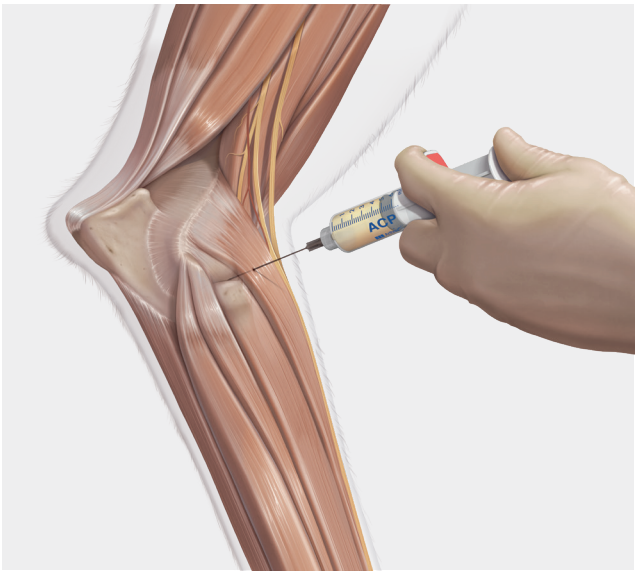
Remove syringe from the centrifuge carefully to avoid mixing the sample. Transfer PRP from lower to upper syringe by carefully depressing the red wings of the syringe. Use at the point of care or freeze for future injections.

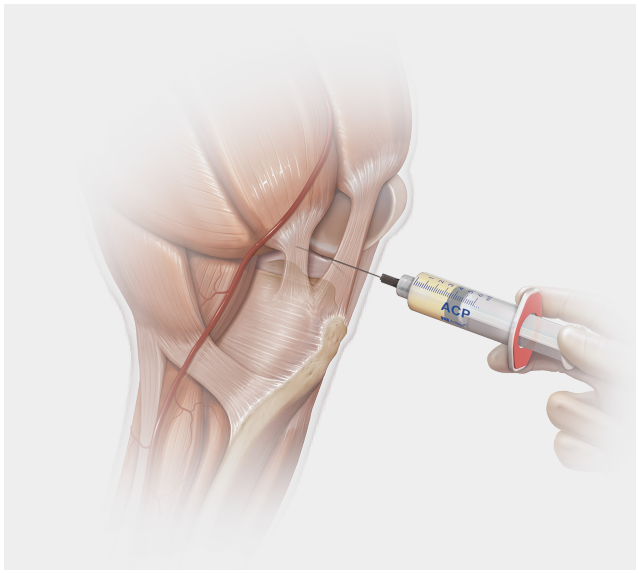
Clinical and Surgical Applications





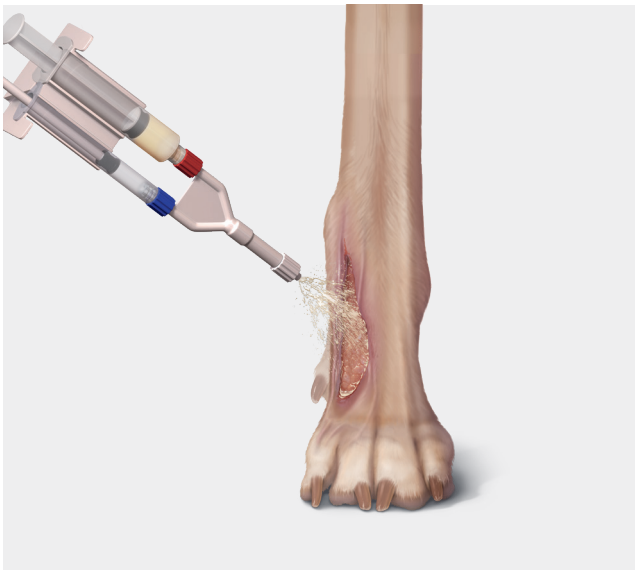
Intratendinous Therapy
Acute or chronic tendonitis and tendinopathy can be treated with PRP injections. PRP can also be used intraoperatively to augment any tendon repair procedure. In a number of in vitro, in vivo, and clinical studies of tendon therapies, PRP has been demonstrated to increase anabolic and extracellular matrix gene expression, induce cell proliferation, improve neovascularization, advance range of motion, and promote early recovery.[11-16]





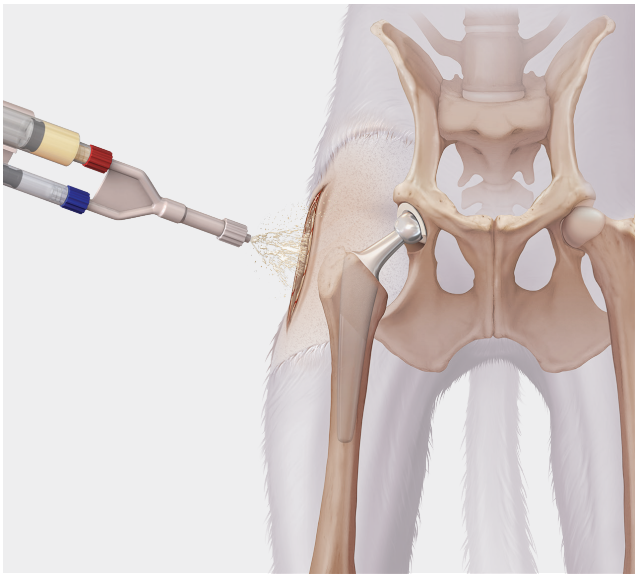
Intra-articular Therapy
PRP has shown significant promise with respect to intra-articular therapy for treatment of cartilage, the meniscus, and osteoarthritis. Studies have described using PRP to increase chondrocyte extracellular matrix production and synovial hyaluronic acid production and to improve pain and function in patients with osteoarthritis.[17-22]

Osteoarthritis is a catastrophic joint disease that severely affects veterinary clients. It is advantageous for a practice to provide an autologous therapy to help relieve the pain associated with osteoarthritis.



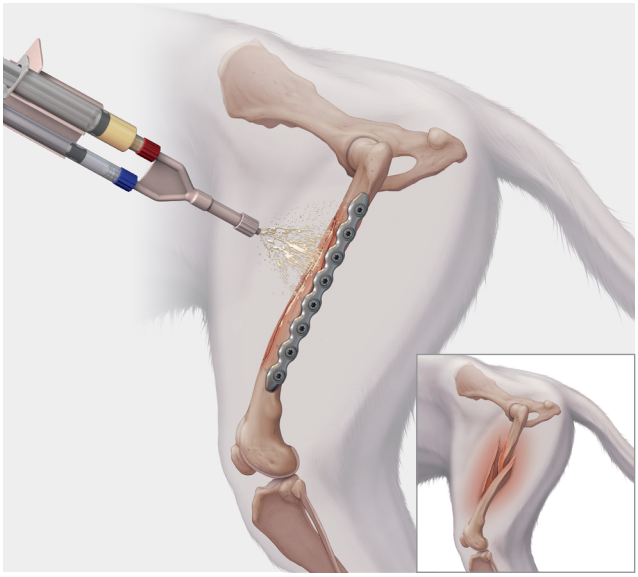
Wound and Ulcer Restoration

Cutaneous ulceration and cutaneous wounds are common problems in veterinary patients. Impairment of the healing process may prevent these lesions from closing. Supplementation with platelets from PRP promotes the release of growth factors and the formation of fibrin matrices, which will induce angiogenesis, extracellular matrix formation, and re-epithelialization, which leads to the eventual closure of these defects.[23-28]



Augmentation of Total Joint Replacements

Joint prosthetics require invasive procedures that come with significant rehabilitation concerns and the potential for major complications. PRP has been used for many years in patients receiving a total joint replacement to help reduce the incidence of arthrofibrosis, improve postoperative range of motion, decrease the risk of infection, enhance wound healing, prevent excess blood loss due to increased hemostasis, and reduce pain levels (which also leads to less narcotic medication use).[29-33]



Promotion of Osseous Regeneration

Bone healing is imperative within veterinary orthopedics when managing fractures, osteotomies, and fusions. A major concern is limiting the numbers of malunions and nonunions that occur by considering the mechanical and biological factors that are required for osseous formation. In combination with stem cells, leukocyte-reduced PRP has been found to improve bone regeneration within defect models and fusions.[34-39]

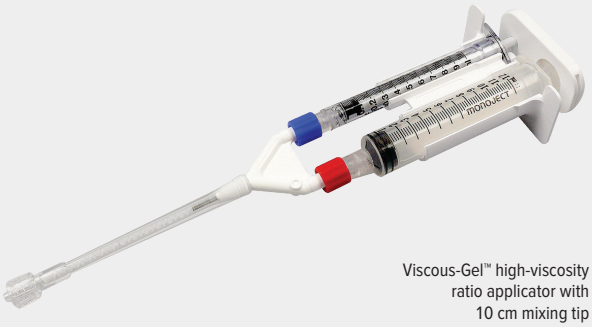
Viscous Delivery Systems

Key Features

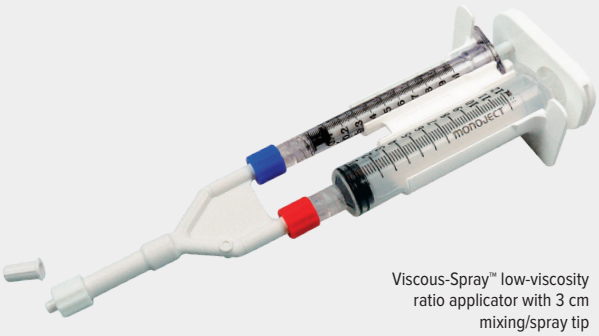
- Use to facilitate mixing and delivery
- Quick and simple to attach and detach
- Easy to fill; no need to disassemble
- 11:1 ratio allows for homologous mixture of two fluids
- Use to provide a low- or high-viscosity fluid
- ACP or PRP can be mixed with allograft or autograft prior to application to an orthopedic surgical site as a spray, gel, or clot
- Extra-long, blunt, fenestrated, and beveled delivery needles

Ordering Information

Product Description	Item Number
Viscous-Gel High-Viscosity Applicator	ABS-**10050**
Viscous-Spray Low-Viscosity Applicator	ABS-**10051**
Viscous-Spray II Low-Viscosity Applicator	ABS-**10052**
Fenestrated Delivery Needle	ABS-**20000**
Tuohy Delivery Needle	ABS-**21000**
Cannula Bending Tool	AR-**6650**



Viscous-Gel™ high-viscosity ratio applicator with 10 cm mixing tip



Viscous-Spray™ low-viscosity ratio applicator with 3 cm mixing/spray tip

Viscous-Spray II low-viscosity ratio applicator with a clog-resistant mixing/spray tip

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This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience, and should conduct a thorough review of pertinent medical literature and the product's directions for use. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level and/or outcomes.

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