Infographic

# Platelet-Rich Plasma: Fundamentals and Clinical Applications

Andrew J. Sheean, M.D., Adam W. Anz, M.D., and James P. Bradley, M.D.

**Abstract:** Platelet-rich plasma (PRP) is perhaps the most widely studied of the biologic therapies, with an ever-growing body of evidence supporting its safety and efficacy in decreasing inflammation and pain and promoting healing in the setting of both nonoperative and operative treatments. PRP is produced by the centrifugation of whole blood, isolating its constituent parts based on their unique densities. These density gradients can be selectively harvested so as to obtain different concentrations of various blood product components, such as platelets and leukocytes. A precise and consistent method for describing the essential characteristics of different PRP formulations is critical for both practical and research purposes. The concentration of platelets, method of activation, and the total number of red blood cells (RBCs), white blood cells (WBCs), and neutrophils relative to baseline values are all of particular importance in accurately describing a PRP formulation. The biologic activity of PRP is manifold: platelet $\alpha$ granules promote the release of various growth factors, including vascular endothelial growth factor and tissue growth factor $\beta$, while inflammation is modulated through inhibition of the nuclear factor-κB pathway. PRP has been convincingly shown to be efficacious in the setting of patellar tendinopathies, knee osteoarthritis, and lateral epicondylitis. In fact, several recent randomized controlled trials have demonstrated the superiority of PRP over both corticosteroids and hyaluronic acid in treating knee OA-related symptoms. There is also substantial promise for the utility of PRP in treating partial hamstring tears and as an adjunct to rotator cuff (RC) repair, especially in the setting of small- to medium-sized tears, where it appears to exert substantial analgesic effects and promote enhanced rates of RC repair healing.

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Arthroscopy
The Journal of Arthroscopic and Related Surgery

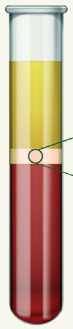
## PRP CATEGORIES

### LEUKOCYTE POOR (LP)

Plasma and Platelets

White Blood Cells (WBCs) and Red Blood Cells (RBCs)

### LEUKOCYTE RICH (LR)



Plasma

Platelets and WBCs

RBCs

**LP**

Osteoarthritis,
Acute muscle injury,
Tendon repair

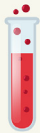
**LR**

Tendinopathy

## PAW CLASSIFICATION

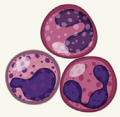
**P**latelet concentration

- Compared to baseline concentration in whole blood



**A**ctivation method

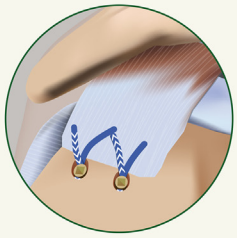
- Endogenous
- Exogenous *(e.g. thrombin, $CaCl_2$, collagen)*



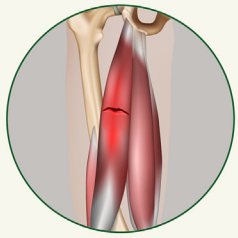
**W**hite blood cells

- Leukocyte poor
- Leukocyte rich

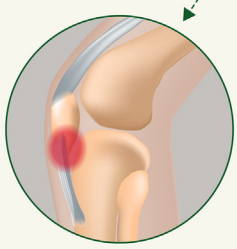
## CLINICAL APPLICATIONS



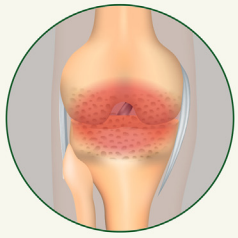
Rotator cuff tear repair



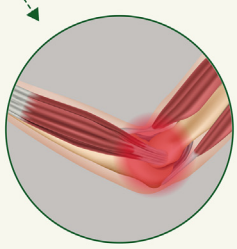
Hamstring injuries



Patellar tendinopathy



Knee osteoarthritis



Lateral epicondylitis

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Abstract and disclosure of potential author conflicts of interest are available at https://www.arthroscopyjournal.org/infographiclibrary2021