PRP Preparation: From Blood Draw to Injection

Preparation stages and standardization considerations

IN BRIEF

Platelet-rich plasma is made from a patient's own blood. The blood is drawn, spun in a centrifuge to concentrate the platelets, and then injected.

Platelets carry growth factors, which is why concentrating them is of clinical interest.

PRP is not one standardized product. Preparation methods differ substantially between facilities and commercial systems, and those differences change what is actually in the syringe.

This document describes general principles drawn from published literature. It is not a clinical protocol.

Introduction

Platelet-rich plasma (PRP) is an autologous, blood-derived product in which platelets are concentrated above baseline levels within a small volume of plasma. Platelets store bioactive mediators, largely in alpha-granules, including platelet-derived growth factor (PDGF), transforming growth factor beta (TGF-beta), vascular endothelial growth factor (VEGF) and insulin-like growth factor (IGF), which are released upon activation or lysis.[1]

The general preparation process

Exact protocols vary between facilities and commercial systems. The published literature describes preparation as generally involving these stages:[1]

- **Collection.** Autologous venous whole blood is drawn using a sterile kit, typically with an anticoagulant such as acid-citrate-dextrose solution to prevent premature platelet activation.[1]
- **Centrifugation.** One or more spins separate red blood cells, platelet-poor plasma and the platelet-rich fraction. A common approach is a double-spin method, where a first soft spin separates red cells from platelet-containing plasma and a second hard spin concentrates the platelets.[1]
- **Leukocyte handling.** Depending on intended use, the platelet-poor plasma and buffy coat may be included or excluded, producing leukocyte-rich or leukocyte-poor preparations. This distinction materially changes the product's composition.[1]
- **Activation.** Some protocols use exogenous activation, such as calcium chloride, to trigger immediate growth-factor release. Others rely on activation occurring naturally after injection.[1]
- **Injection or storage.** Fresh PRP is generally administered soon after preparation. Deferred use requires cryopreservation with documented freeze-thaw handling.[1]

Why standardization matters

A 2026 PRISMA-guided methodological review examined 23 orthopedic PRP studies and found substantial inconsistency in how preparation was reported. Whole blood volume and anticoagulant were each reported in only 15 of 23 studies, centrifugation parameters in 12 of 23, explicit platelet dose in just 6 of 23, and storage or time-to-use conditions in only 3 of 23.[1] The authors concluded that under-reporting of these manufacturing

variables makes outcomes difficult to compare across studies, because products labeled PRP may differ substantially in actual composition.[1]

Evidence status

Evidence status	What this means
Established	PRP's basic composition, being concentrated platelets and growth factors from autologous blood, and its general safety profile as an autologous product, are well documented.[1]
Emerging	Comparative performance between preparation approaches is an active area of study, but no single approach has been established as superior across indications.
Limited	Centrifugation parameters, leukocyte handling, activation strategy and storage practices vary widely across studies and commercial systems, which limits how directly findings from one study or product generalize to another.[1] This document does not recommend one preparation approach over another.

Key points

- ▪ Preparation generally involves collection, centrifugation, leukocyte handling decisions, optional activation, and injection or storage.
- ▪ PRP is not a single standardized product. Leukocyte content, platelet dose and activation status vary between preparations.
- ▪ Published research shows inconsistent reporting of these manufacturing variables, which limits direct comparison between studies.
- ▪ Specific preparation should follow validated, facility-specific procedures carried out by trained personnel.

Source verification

Claim in this document	Source	Evidence strength	Limitations
PRP composition and growth factors (PDGF, TGF-beta, VEGF, IGF)	Berdini et al., LabMed, 2026. DOI 10.3390/labmed3010008	High, PRISMA review	Very recent journal, not yet PubMed indexed
General preparation stages from collection through storage	Berdini et al., 2026	High	Describes literature-derived practice, not a single mandated protocol
Reporting gaps across 23 studies in blood volume, centrifugation, dose and storage	Berdini et al., 2026	High, primary finding of the review	Findings specific to orthopedic-indication studies

References

[1] Berdini M, Clementi G, Torcianti M, Del Bianco D, Cantori I, Procaccini R, Gigante A. Standardization of Platelet-Rich Plasma Preparation in Orthopedics: A Review of the Literature and Proposal for a Reproducible Protocol. LabMed. 2026;3(1):8. DOI 10.3390/labmed3010008.

patients should review current evidence and product documentation, and clinical decisions should be made by a qualified provider for each individual patient.