

# Platelet-Rich Plasma Therapy in Androgenetic Alopecia: Mechanisms and Results

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## Introduction

Androgenetic alopecia, commonly referred to as male or female pattern hair loss is a genetically predisposed condition characterized by progressive thinning of the scalp hair in a defined pattern. It affects a significant proportion of the population, particularly men, with some studies estimating a prevalence of over 50% in males over the age of 50. The pathophysiology of androgenetic alopecia involves a combination of genetic susceptibility and hormonal influence, specifically the activity of Dihydrotestosterone (DHT) on hair follicles. Over time, terminal hair follicles undergo miniaturization, leading to a decrease in hair density and coverage. Traditional treatment modalities, including topical minoxidil and oral finasteride, have been used with varying success but are often associated with limited efficacy, compliance issues, or side effects. In recent years, Platelet-Rich Plasma (PRP) therapy has emerged as a novel, minimally invasive treatment option that leverages the body's own regenerative capabilities to promote hair regrowth and counteract follicular miniaturization [1].

PRP is an autologous concentration of platelets suspended in a small volume of plasma, obtained by centrifuging the patient's own blood. Platelets, beyond their traditional role in hemostasis, are known to contain alpha granules that release a multitude of growth factors and cytokines. These include Platelet-Derived Growth Factor (PDGF), Vascular Endothelial Growth Factor (VEGF), Transforming Growth Factor Beta (TGF- $\beta$ ), Epidermal Growth Factor (EGF) and insulin-like growth factor (IGF), among others. When injected into the scalp, PRP is believed to stimulate the activity of dermal papilla cells, enhance angiogenesis around the hair follicle and prolong the anagen (growth) phase of the hair cycle. It may also exert anti-inflammatory effects and counteract the apoptosis of follicular cells, creating a more favorable microenvironment for hair regeneration [1].

## Description

The application process of PRP in androgenetic alopecia generally involves drawing venous blood from the patient, centrifuging it to isolate the platelet-rich fraction and injecting the PRP into the affected areas of the scalp using fine-gauge needles. The procedure is often performed without general anesthesia, though topical numbing agents or local anesthetics may be used to minimize discomfort. Treatment protocols vary but typically include monthly sessions for the first three to four months, followed by maintenance sessions every three to six months. Some practitioners also combine PRP therapy with microneedling to enhance absorption and stimulate further dermal remodeling. Clinical studies and case series evaluating the efficacy of PRP in androgenetic alopecia have generally reported encouraging results. In numerous trials, patients undergoing PRP therapy experienced an increase in hair density, thickness and an overall

improvement in scalp coverage. Dermoscopic assessments often reveal increased hair shaft diameter and the emergence of new hair follicles, especially in the vertex and frontal regions of the scalp. In one of the largest controlled studies, subjects who received PRP injections showed statistically significant improvement in hair count compared to controls who received saline injections. Moreover, many patients report subjective satisfaction and perceive visible improvement after just a few sessions, making PRP an appealing option for those seeking nonsurgical solutions.

The safety profile of PRP therapy is also noteworthy. Since the product is derived from the patient's own blood, the risk of allergic reactions, transmissible infections, or immune responses is minimal. Common side effects are usually limited to mild pain, redness, or swelling at the injection site, which resolve spontaneously within a few days. There is no significant downtime, allowing patients to resume daily activities soon after treatment. This favorable safety and tolerability, combined with the absence of systemic pharmacologic effects, make PRP suitable even for patients who cannot tolerate minoxidil or finasteride due to adverse effects. Despite the growing popularity of PRP therapy, several challenges and limitations remain. There is a lack of universally accepted protocols regarding the preparation, concentration and administration of PRP. Variability in centrifugation techniques, platelet counts and activation methods can lead to inconsistent outcomes across studies. Furthermore, the optimal frequency and duration of treatment sessions are still subjects of ongoing investigation. While some patients experience substantial improvement, others may exhibit minimal or no response, possibly due to differences in hair loss severity, follicular health, or individual biological response to treatment. It is also important to recognize that PRP may not replace established therapies but rather serve as an adjunct or alternative, especially in patients who are early in the course of hair loss or those who seek additional enhancement alongside minoxidil or finasteride. Combination therapies may offer synergistic benefits, as minoxidil enhances hair follicle vascularity and finasteride reduces DHT levels, while PRP promotes growth factor-mediated regeneration. Some clinicians also incorporate low-level laser therapy or nutritional support to further improve outcomes [2].

## Conclusion

Platelet-rich plasma therapy has emerged as a promising and safe option in the management of androgenetic alopecia. Its mechanism involves the delivery of a concentrated mix of autologous growth factors that stimulate follicular regeneration, angiogenesis and prolongation of the anagen phase. While not a universal cure, PRP offers a minimally invasive, well-tolerated intervention with a growing track record of efficacy in both men and women experiencing pattern hair loss. Further research is needed to standardize treatment protocols, optimize patient selection and elucidate long-term outcomes. Nonetheless, PRP represents a valuable tool in the expanding arsenal of hair restoration therapies, bridging the gap between pharmacologic and surgical interventions in the treatment of androgenetic alopecia.

## Acknowledgement

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## Conflict of Interest

None.

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## References

1. Gangadhar, Tara C and Robert H. Vonderheide. "Mitigating the toxic effects of anticancer immunotherapy." *Nat Rev Clin Oncol* 11 (2014): 91-99
2. Chen, Daniel S and Ira Mellman. "Oncology meets immunology: The cancer-immunity cycle." *immunity* 39 (2013): 1-10.

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