MSC-Derived Secretome and Exosomes vs. Platelet-Rich Plasma: A Mechanism and Evidence Comparison

Two regenerative modalities with fundamentally different biological origins — what the head-to-head evidence actually shows for hair and skin regeneration

Prepared for RCX Network Partner Clinics — Hair Restoration & Regenerative Aesthetics

Purpose

This reference is written for physicians, PAs, NPs, and estheticians comparing MSC/adipose-derived stem cell (ASC) secretome and exosome products against platelet-rich plasma (PRP) for hair and skin regeneration. It summarizes what each modality actually delivers biologically, and what head-to-head evidence exists — as distinct from the donor-age question addressed in the companion reference, "Donor Age, Tissue Source, and the Inflammatory Bias of the Regenerative Secretome."

The Core Clinical Question

PRP and MSC/ASC-derived secretome are often discussed as interchangeable "regenerative" options, but they differ in origin at a fundamental level. PRP is prepared from the patient's own blood via venipuncture and centrifugation, concentrating platelets that release their stored growth factors upon activation. MSC/ASC-derived secretome and exosomes are collected from cells actively cultured and secreting in a laboratory setting — a fundamentally different production process that does not require drawing the patient's blood at each session and allows for a standardized, off-the-shelf product.

The Mechanism: What Each Modality Actually Delivers

PRP's regenerative activity comes primarily from growth factors stored in platelet alpha-granules — chiefly PDGF, TGF-β, and VEGF — released upon platelet activation at the time of preparation. Because PRP is autologous, its exact composition is bound to the health and biology of the individual patient's own platelets at the time of the draw.

MSC/ASC-derived secretome contains a broader category of paracrine signals actively secreted by living cells in culture — soluble growth factors and cytokines alongside extracellular vesicles (exosomes) carrying protein, lipid, and microRNA cargo involved in cell-to-cell communication. A key distinction the literature emphasizes: platelet-derived extracellular vesicles (produced during PRP activation) and MSC-derived extracellular vesicles (produced by cultured cells) differ in composition, production method, regulatory status, and evidence base — they are not interchangeable just because both are loosely termed "exosomes."

The Published Evidence

1. Comprehensive review: PRP has more mature evidence, exosomes are earlier-stage but promising

Balwi and Koldas's 2026 narrative review in *Frontiers in Medicine*, searching PubMed/MEDLINE, Scopus, and Google Scholar through February 2025, found that PRP shows moderate-to-strong evidence in androgenetic alopecia, with reported hair density increases of approximately 10-30 hairs per sq cm in randomized trials. Exosome-based approaches show encouraging preclinical and early clinical signals — increased dermal papilla

cell proliferation, angiogenesis, and modulation of inflammatory pathways — but the evidence base remains less mature and more heterogeneous than PRP's.

2. Head-to-head clinical trial: non-inferior results, with a practical delivery advantage

Estupiñan, Ly, and Goldberg's 2025 investigator-blinded, split-face, non-inferiority trial directly compared adipose MSC-derived (ASC) exosomes against PRP for photoaged facial skin, with both applied following radiofrequency microneedling. Both modalities equally improved wrinkling, dyschromia, erythema, texture, and overall appearance, with comparable histological increases in collagen I and glycosaminoglycans. The authors note ASC exosomes may be attractive to needle-averse patients and can shorten office visits, since phlebotomy and centrifugation are not required to produce the product itself.

3. Direct in vitro comparison favors ASC-exosomes on dermal papilla cell activity

Nilforoushzadeh, Aghdami, and Taghiabadi (2021, *Cell Journal*) compared exosomes derived from human adipose stem cells (hASC-Exo) against PRP-derived exosomes (PRP-Exo) at matched concentrations on human dermal papilla cells. At 100 µg/mL, hASC-Exo significantly outperformed PRP-Exo in promoting dermal papilla cell proliferation and migration while maintaining markers of hair inductivity.

4. Broader alopecia literature situates secretome alongside — not necessarily above — PRP

Shimizu et al.'s 2022 narrative review in *Regenerative Therapy* summarizes MSC implantation, MSC-derived secretome, and PRP together as the most evidence-supported regenerative strategies for alopecia, while noting each has distinct practical and regulatory considerations that affect real-world adoption.

> **Clinical translation:** Because PRP is autologous, its quality is inherently bound to the patient's own biology — including the donor-age-related inflammatory drift covered in the companion "Donor Age" reference in this series. A cell-free, allogeneic secretome product like Cellavé sidesteps that variability by sourcing from a single, consistent, young donor-tissue standard rather than the patient's own age-affected platelets. This is a sourcing and standardization rationale, not a claim that Cellavé has been directly tested head-to-head against PRP in a published trial.

Key Takeaways for Practitioners

- PRP and MSC/ASC-derived secretome are biologically distinct, not interchangeable versions of the same therapy — one is autologous platelet-derived, the other is cultured-cell-derived
- PRP currently has the more mature clinical evidence base specifically in androgenetic alopecia; MSC/ASC-exosome evidence is promising but earlier-stage and more heterogeneous
- The one available head-to-head split-face trial in aesthetic skin found ASC exosomes non-inferior to PRP, with a practical advantage in not requiring phlebotomy — but this is one trial in photoaged skin, not hair restoration specifically
- A direct in vitro comparison found ASC-derived exosomes outperformed PRP-derived exosomes on dermal papilla cell proliferation and migration at matched concentrations
- PRP's autologous nature ties its quality to the patient's own donor biology, including the age-related inflammatory drift documented in this series' companion Donor Age reference

A Note on Scientific Framing

The evidence above supports MSC/ASC-derived secretome and exosomes as a mechanistically distinct and, in available comparisons, at least non-inferior alternative to PRP — it does not establish that secretome-based products are clinically superior to PRP for hair restoration specifically, since the strongest head-to-head trial available is in facial skin, not hair. Practitioners should not repeat unverified marketing figures (e.g., specific growth-factor counts attributed to exosomes) that do not trace to a peer-reviewed source, and should present this evidence as a sourcing and mechanism rationale rather than a claim of proven outcome superiority over PRP in hair restoration.

References

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