# Green vesicles, golden opportunities: plant-derived nanovesicles from pharma to cosmetic applications

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Plant-derived nanovesicles (PDNVs) are gaining increasing attention as a sustainable and versatile platform at the interface of nanotechnology, medicine, and cosmetics [1–3]. Among them, rose petal-derived nanovesicles (RP-NVs) exemplify how natural carriers can be exploited for multiple applications, bridging therapeutic and wellness domains. Isolated through differential centrifugation and size exclusion chromatography, RP-NVs display a stable nanoscale morphology and carry a bioactive cargo enriched in lipids, phenols, and proteins. Their biological relevance is highlighted by their ability to promote fibroblast migration and modulate extracellular matrix remodeling, supporting tissue repair while avoiding fibrotic responses [2,3]. At the same time, their intrinsic antioxidant activity and excellent cytocompatibility make them suitable for cutaneous application, where they can be integrated into topical formulations without altering rheological properties or compromising stability. In vivo studies confirmed biocompatibility, skin tolerance, and maintenance of barrier integrity, hydration, and comfort, further supporting their translational potential. Notably, RP-NVs withstand freeze-drying without cryoprotectants, a feature that facilitates storage and industrial scalability. Overall, RP-NVs emerge as "green vesicles" with "golden opportunities," representing a unique class of natural nanocarriers capable of serving dual functions: as innovative nanotherapeutics for regenerative medicine and as advanced cosmetic ingredients that sustain skin health and aging prevention [1–4].

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**References**

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