L'ORÉAL
Dermatological Beauty

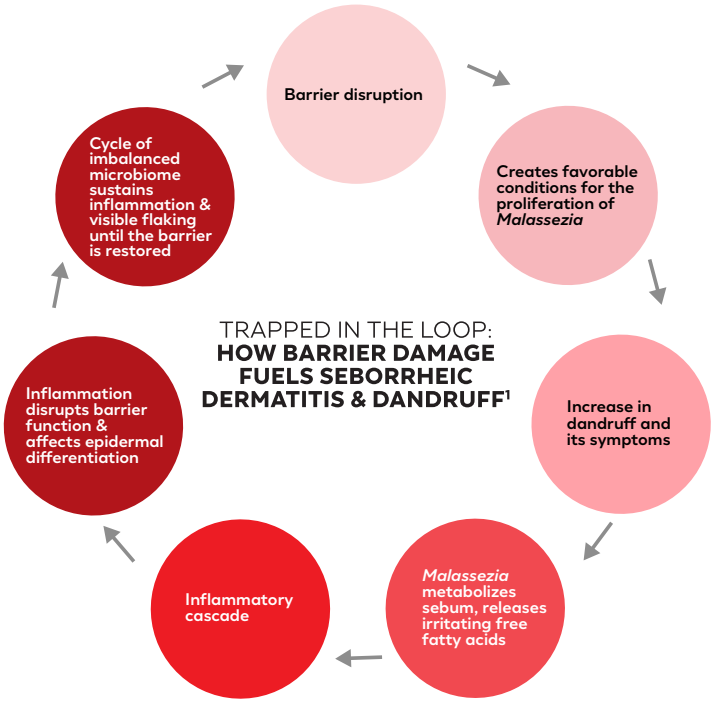
CLINICAL SERIES

SCALP HEALTH AND SALICYLIC ACID: REBALANCING THE MICROBIOME

For decades, seborrheic dermatitis and dandruff were treated as mere cosmetic concerns, an aesthetic issue of visible flakes rather than a true dermatologic condition. Today, emerging evidence tells a different story. Beneath the visible scaling lies a compromised skin barrier, disrupted lipid composition, and a microbiome in disarray.[1] Dandruff-affected scalps exhibit quantifiable barrier impairment with elevated transepidermal water loss (TEWL) and reduced hydration compared with normal scalps.[1] Barrier disruption coincides with altered microbiome diversity, including increases in *Staphylococcus*, which correlate with barrier damage, pruritus, and scaling. Conversely, higher *Malassezia* is linked to disease severity.[1,2] Emerging science redefines how dermatologists view and manage the scalp barrier and microbiome and places salicylic acid (SA), a molecule as old as modern dermatology itself, at the core of that strategy.

SALICYLIC ACID'S MULTIFACETED MECHANISM OF ACTION

Used in medicine for more than 2,000 years, SA remains one of dermatology's most enduring and studied active ingredients.[3] Once considered simply as a keratolytic agent, new understanding reveals that it performs a series of coordinated functions: dissolving intercellular lipids, penetrating the stratum corneum, disrupting cellular junctions through desmolysis, promoting exfoliation, and enhancing the delivery of other topical agents.[3]



Its behavior begins with its chemistry. Because of its lipophilic properties, SA removes intercellular lipids that are covalently linked to the cornified envelope of surface epithelial cells.[3] Its lipid solubility allows it to mix with epidermal and sebaceous lipids, enabling activity within the outer skin layers.[3] Once considered a keratolytic agent, SA is now recognized as a desmolytic compound because it disrupts cellular junctions rather than breaking or lysing intercellular keratin filaments.[3]

At this level, its mechanism shifts from chemical to structural. SA acts as a desmolytic agent, selectively disrupting the corneodesmosomal bonds that connect corneocytes while sparing the underlying keratin framework.[3] The result is a controlled loosening of the outer epidermal layer rather than destructive peeling, a distinction that underpins both its safety and its clinical versatility.

The downstream effects are both visible and measurable. Through this cascade of lipid dissolution, penetration, and desmolysis, SA promotes exfoliation by reducing cohesion among epidermal cells in the upper layer of skin.[3] By thinning the compacted surface scale, it relieves the mechanical burden of adherent flake and enhances the scalp's receptivity to other topical treatments, an effect supported

by evidence showing that SA increases the penetration of accompanying agents.[3]

This final property, enhancing penetration, is particularly significant in scalp care. A dense layer of keratinized buildup can prevent antifungal, anti-inflammatory, and hydrating ingredients from reaching their intended targets. By clearing that barrier, SA can potentially open an avenue for accompanying therapies.[3]

In practical terms, this makes SA far more than a simple exfoliant. It is a biochemical catalyst that converts the scalp's obstructed surface into one capable of recovery, restoring physiological balance while preparing the skin to respond more effectively to treatment.

CLINICAL EVIDENCE: RAPID RELIEF AND TOLERANCE

In a single-center, double-blind, randomized, vehicle-controlled study of 67 adults with mild-to-moderate scalp psoriasis, *Massiot et al.* (2023) assessed the efficacy and tolerability of a keratolytic and hydrating shampoo containing 2% salicylic acid, 5% urea, and 1% glycerin.[4]

Participants applied the shampoo daily for two weeks, then three times per week for an additional two weeks.[4] The active formulation produced measurable benefit as early as Day 1, with progressive improvement through Day 30 in Psoriasis Scalp Severity Index (PSSI), investigator global assessment, and quality-of-life scores compared with vehicle.[4]

In seborrheic dermatitis (SD), clinical research has demonstrated that combining selenium disulfide (SeS_2) with SA offers an effective, well-tolerated option for moderate-to-severe scalp disease.[5] In a randomized, double-blind trial, *Barbosa et al*. (2024) compared the clinical benefit of a 1% SeS_2 shampoo containing 1% SA with a 2% ketoconazole shampoo.[5] Both treatments improved symptoms after the first application, and by Day 28, the SeS_2–SA shampoo achieved a 71% reduction in severity and a 75% decrease in scaling, similar to ketoconazole.[5] All patients improved to mild disease, and quality of life scores rose faster with the SeS_2–SA formulation, which was also rated higher for cosmetic acceptability. Investigators concluded that this combination provides a reliable, well-tolerated, patient-friendly alternative for controlling SD while supporting better treatment adherence.[5]

In a real-world, observational study of 759 subjects with common scalp and hair conditions, *Zong et al*. (2023) evaluated the clinical practice of a SeS_2 1% shampoo containing 0.9% salicylic acid, vitamin E, and Ceramide-R.[6] Participants used the shampoo for an average of three weeks, three times per week, either alone or alongside other therapies.[6] Dermatologists and patients reported high satisfaction and tolerance, with 89.6% rating the regimen as beneficial and 95.4% as very well tolerated.[6]

SALICYLIC ACID AS A FUTURE CATALYST FOR SCALP RENEWAL

Mechanistic and clinical evidence now show that SA functions beyond surface exfoliation. Through its lipophilic and desmolytic actions, it removes intercellular lipids and disrupts cellular junctions to enable controlled exfoliation and renewal of the scalp surface.[3] Because of its lipophilic and desmolytic properties, salicylic acid disrupts the cellular junctions that hold corneocytes together without damaging the underlying structure, enabling controlled exfoliation and renewal of the surface barrier.[3] Across studies, this mechanism has translated into measurable clinical benefit: in scalp psoriasis, SA–based formulations deliver visible improvement within a day and sustained results through 30 days; in seborrheic dermatitis, the combination of selenium disulfide and SA reduces scaling and itching faster than ketoconazole.[5-7]

Together, these data outline a new model for chronic scalp care built on three pillars: desmolytic keratolysis to remove obstructive scale, microbial modulation to rebalance *Malassezia* and bacterial communities, and barrier repair to restore hydration and lipid structure. Within this framework, SA functions not as an accessory but as the initiating step in renewal, converting a compromised scalp into one capable of lasting balance.

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