Rapid Molecular Differentiation of Psoriasis and Atopic Dermatitis using Skin Biopsy Samples in Clinical Routine: Impact on Therapeutic Decision-Making

Frank Friedrich Gellrich, Isabelle Glöyer, Susanne Abraham

Department of Dermatology, University Hospital Carl Gustav Carus, Technische Universität Dresden, Dresden, Germany

Background

The differential diagnosis between Psoriasis Vulgaris (PV) and Atopic Dermatitis (AD) is a frequent challenge that delays the selection of targeted therapies (e.g., IL-17/23 vs. IL-4/13 inhibitors). While ancillary diagnostics like IL-36γ immunohistochemistry provide valuable clues, they can be inconclusive in ambiguous cases.

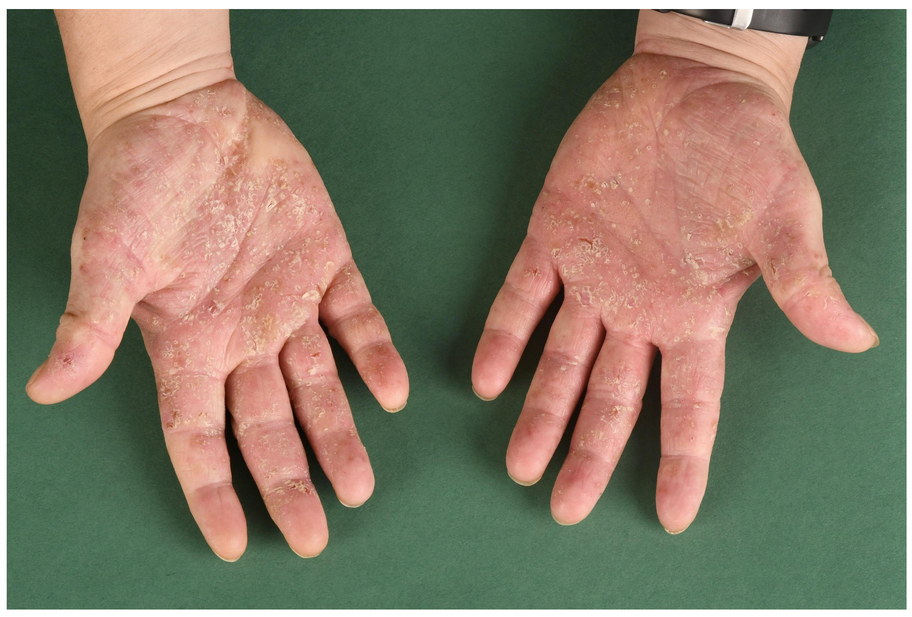
To address this diagnostic gap, the PsorX Test offers a rapid, automated molecular analysis. It assesses a disease-specific gene expression signature, including biomarkers NOS2 and CCL27, directly from FFPE tissue in approximately 2 hours. This provides a definitive molecular result to resolve uncertainty and guide treatment decisions.

Workflow

For patients with an uncertain clinical diagnosis of psoriasis versus eczema, the diagnostic FFPE biopsy was analyzed using three parallel methods: conventional H&E histology, IL-36γ immunohistochemistry, and the automated PsorX Test. The combined findings were used to form a final, integrated diagnosis and guide therapeutic decisions.

Clinical Case Presentations

Case 1: 44-Year-Old Female with Ambiguous Palmar Dermatitis

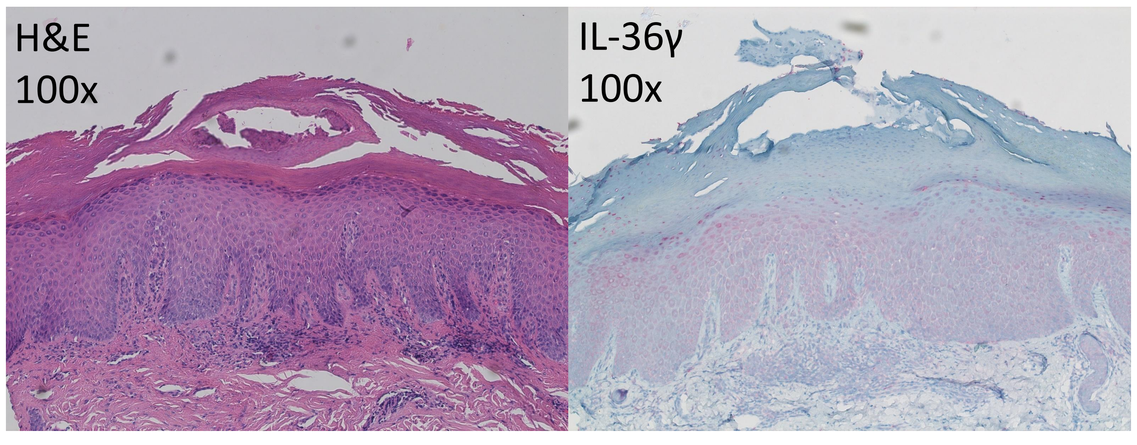


Clinical & Histological Findings

Presentation: A 44-year-old female presented with a one-year history of palmar lesions unresponsive to potent topical steroids. The clinical picture of erythema, scaling, vesicles, and pustules was highly ambiguous, preventing a clear differentiation between dyshidrosiform eczema and palmoplantar pustular psoriasis.

Histopathology: The biopsy presented a diagnostic challenge. Key features included mild acanthosis, spongiosis, and lymphocytic exocytosis. A preserved granular layer and the absence of definitive neutrophilic abscesses strongly pointed away from classic psoriasis, leading to an initial diagnosis favoring spongiotic dermatitis (eczema).

Immunohistochemistry: Staining for the psoriasis-associated marker IL-36γ was inconclusive, showing only a focally increased expression that failed to resolve the diagnostic uncertainty

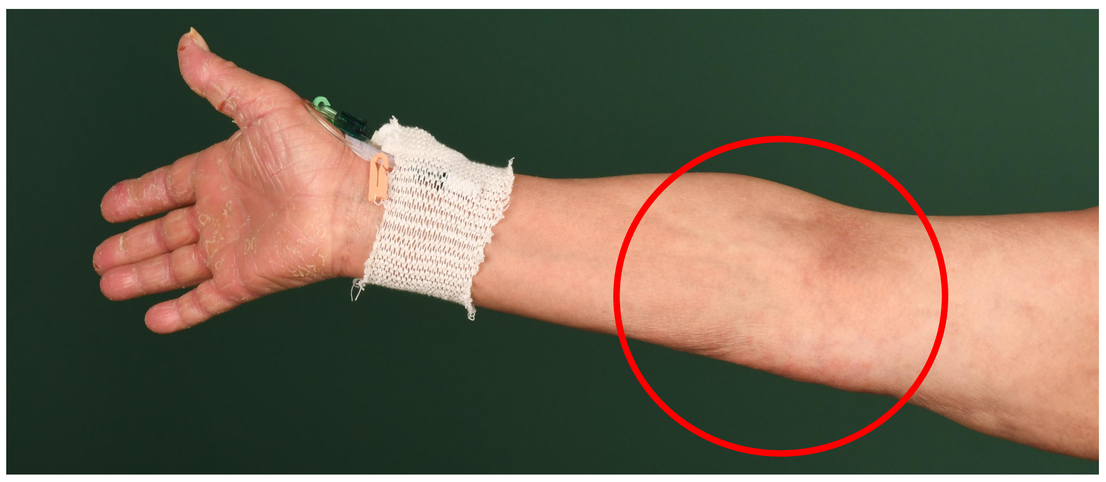


Molecular Insight & Clinical Impact

PsorX Test Result: Given the conflicting data, molecular analysis was performed. The PsorX test provided a definitive result, identifying a Positive Psoriasis Molecular Signature (96% Probability).

Integrated Diagnosis & Management: The molecular finding served as the crucial tie-breaker. The final integrated diagnosis was revised to Palmoplantar Psoriasis. Consequently, the patient's treatment was changed to a psoriasis-specific topical therapy (betamethasone + calcipotriol), with a clear plan for systemic agents if required.

Case 2: 62-Year-Old Female with a New Eruption and a History of Psoriasis

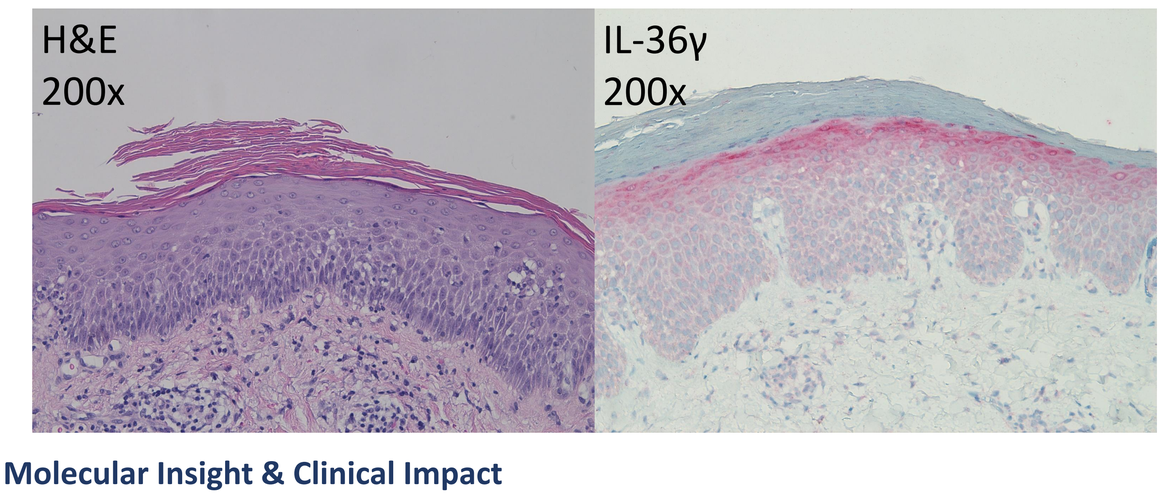


Clinical & Histological Findings

Presentation: A 62-year-old female with a 2-year history of psoriasis, with prominent palmoplantar involvement, developed a new, generalized eczematous eruption. The coexistence of both diseases was considered, creating a complex clinical scenario and a therapeutic dilemma.

Histopathology: The biopsy was ambiguous, showing features of both eczema (mild spongiosis, eosinophils) and psoriasis (parakeratosis, acanthosis). The overall impression leaned slightly towards an eczematous process.

Immunohistochemistry: In direct contradiction to the histology, IHC revealed strong, diffuse IL-36γ expression throughout the granular layer—a finding highly characteristic of psoriasis. This created a significant diagnostic conflict.



Molecular Insight & Clinical Impact

PsorX Test Result: To resolve this contradictory profile, molecular analysis was performed. The PsorX test indicated that a psoriasis diagnosis was unlikely, returning a Negative Psoriasis Molecular Signature.

Integrated Diagnosis & Management: The molecular result aligned with the histopathology and overruled the misleadingly strong IL-36γ signal. The final integrated diagnosis was confirmed as Eczematous Dermatitis. This finding provided crucial validation for the ongoing treatment with Dupilumab.

Summary & Conclusion

These cases demonstrate that rapid molecular analysis with the PsorX Test can effectively resolve diagnostic uncertainty in clinically and histologically ambiguous cases of psoriasis versus eczema.

The objective gene expression signature provides a crucial layer of evidence, acting as a "tie-breaker" when conventional histopathology and ancillary immunohistochemistry (IL-36γ) provide conflicting or inconclusive results.

Integrating this molecular insight directly into the diagnostic workflow has a significant clinical impact, enabling more confident diagnoses and guiding the selection of appropriate targeted therapies.

The PsorX Test represents a powerful tool to bridge the gap between morphological assessment and molecularly-driven precision medicine in inflammatory dermatoses.

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Author Information & Contact

Dr. med. Frank Friedrich Gellrich
Department of Dermatology
University Hospital Carl Gustav Carus
at Technische Universität Dresden
Fetscherstr. 74, 01307 Dresden, Germany
Email: frankfriedrich.gellrich@ukdd.de

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