

EDITORIAL

Precision medicine in rhinology: Redefining diagnosis and treatment in the era of molecular individualization

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Over the past two decades, the medical community has witnessed a transformative shift from a generalized, symptom-oriented type of care to a more individualized, predictive, and preventive approach which is broadly defined as precision medicine. Based on the integration of genomic, molecular, phenotypic, and environmental data, precision medicine aims to adapt therapeutic strategies to the specific biological profile of each patient. In rhinology, this approach is no longer a futuristic ideal but an emerging reality, with significant implications for the diagnosis, classification, and treatment of upper airway disorders.

Chronic rhinosinusitis (CRS), one of the most prevalent and heterogeneous conditions in rhinology, exemplifies the need for precision in clinical decision-making. Traditional classifications based on clinical phenotypes (e.g., CRS with or without nasal polyps) have proven insufficient in predicting disease evolution or treatment response. Recent advances have identified distinct endotypes within CRS, characterized by specific inflammatory pathways, such as type 2 (Th2) eosinophilic inflammation, which are now being used to guide biologic therapy selection^{1,2}.

The approval and clinical use of biologics such as dupilumab, omalizumab, and mepolizumab for patients with refractory chronic rhinosinusitis with nasal polyps (CRSwNP) mark a turning point in rhinologic care. These therapies target key mediators of type 2 inflammation (IL-4, IL-5, IL-13, and IgE) and have demonstrated significant improvements in symptom control, quality of life, and re-

duction of surgical interventions³⁻⁵. Such therapeutic advances prove the importance of accurate biomarker profiling and the integration of immunological and molecular diagnostics into routine clinical practice.

Despite its promise, the implementation of precision medicine in rhinology faces significant challenges. Access to advanced diagnostic tools such as tissue cytokine profiling, genetic testing, or high-resolution imaging remains limited in many clinical settings. Moreover, cost considerations, healthcare policy, and disparities in medical infrastructure continue to hold back the widespread adoption of personalized therapeutic strategies, especially in low- and middle-income countries⁶.

From a research perspective, the field is rapidly evolving. Exploring nasal microbiome signatures, local tissue transcriptomics, and single-cell RNA sequencing may offer a deeper understanding of disease mechanisms and discover novel therapeutic targets. Moreover, machine learning algorithms and AI-powered clinical decision support systems show the possibility to enhance the precision of personalized care^{7,8}.

As Romanian rhinologists, we are at a critical moment. Embracing precision medicine is not merely about integrating novel therapies into our practice; it is about promoting a mindset of scientific rigor, interdisciplinary collaboration, and patient-centered innovation. Developing local guidelines for biologic therapy eligibility and participating in international clinical trials are crucial steps forward.

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Received for publication: April 2, 2025 / **Accepted:** April 10, 2025

In conclusion, precision medicine offers a unique opportunity to redefine our clinical approach, transforming rhinology from an experience-based art to a data-driven science. The future lies not only in knowing what works, but in understanding for whom, why, and how to deliver it most effectively.

Funding: None.

Conflict of interest: The author has no conflict of interest.

Financial disclosure: There are no financial disclosures of the author.

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