Life Science

Foundational Research for the Comprehensive Understanding of Allergic Diseases and the Development of Preventive Strategies

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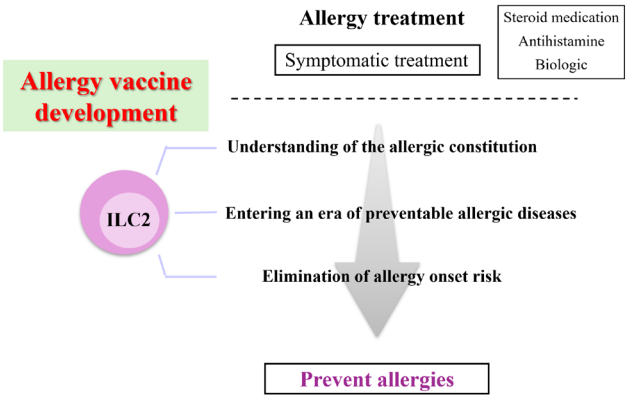
Purpose of Research

Allergic diseases were traditionally understood as immune responses to antigens. However, the discovery of group 2 innate lymphoid cells (ILC2s) in 2010 revised this view. ILC2s can trigger allergic inflammation in response to endogenous factors, independent of antigens. We found that ILC2s contribute to the development of an "allergic constitution." This study aims to define this concept scientifically and explore its role in allergy pathogenesis and prevention.

Summary of Research

ILC2s are known to induce allergic responses independently of antigens, highlighting the role of innate immunity in allergy. This study focuses on ILC2-driven immune networks to clarify the nature of the pre-disease allergic state and identify early factors involved in disease progression. Using multi-omics approaches, we aim to discover predictive biomarkers and establish preventive strategies based on early immunometabolic changes.

Realization of allergy prevention



Entering an era of preventable allergic diseases

Points

- Elucidation of the mechanism by which ILC2s contribute to the formation of the allergic constitution
- Identification of predictive biomarkers for allergy onset
- Establishment of preventive strategies for allergic diseases

Comparison with Conventional or Competitive Technologies

- This study focuses on the previously untargeted pre-disease state.
- The allergic constitution is explored via the novel concept of ILC2s.

Expected Applications

- Enables development of devices to predict allergy risk.
- Leads to preventive allergy vaccines.

Challenges in Implementation

Candidate markers indicating ILC2 activation during the pre-disease phase have been identified, but it is necessary to develop precise methods (technologies) for their quantification.

What We Expect from Companies

This study takes on the challenge of positioning clinically relevant ILC2s not only as a therapeutic target but also as a predictor of allergy onset. It promotes a paradigm shift from treatment to prevention of allergic diseases.

Future Developments

April 2025 Understanding the allergic constitution in humans
April 2026 Exploration and validation of predictive factors for allergy onset in humans
April 2027 Establishment of preventive strategies in mouse models and simulation in humans

■Grants :JST FOREST
■Awards :JSI 16th Young Investigator Award
■Patent :none
■Model :none
■Sample :none

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