Pathophysiology, biomarkers, and therapies for asthma endotypes: Exploring the immunology of asthma.

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Abstract

In children and adults, asthma is a frequent condition that has a high morbidity, mortality, and economic cost. Asthma is generally acknowledged as a diverse disease, and recent advances in clinical and laboratory studies have clarified our understanding of the immunology that underlies the condition. The future of asthma is endotype classification, which links observable traits with immunological processes. This in-depth analysis of the immunology of asthma covers the pathophysiology currently understood, clinical practise biomarkers, as well as cutting-edge biologic and tailored treatments for all asthma endotypes. Understanding the immunology of asthma will help medical professionals classify individuals according to their endotype and offer individualised, biomarker-driven therapy to efficiently control their asthma.

Keywords: Immunology, Asthma, Allergy, Biomarkers.

Introduction

One of the most common paediatric chronic diseases, asthma disproportionately affects African Americans and people living in poverty. Exacerbations of asthma result in missed days from work and school, hospitalisations, ER visits, and more than 3000 fatalities per year. A significant financial burden is also associated with asthma, which is greatest for those with poorly managed asthma and in low-income nations [1].

More effective asthma treatment is desperately needed. Asthma was once thought to have a single diagnosis and standardised treatments for all patients, but it is now recognised as a heterogeneous, multifactorial disorder with a range of genetic and environmental factors, responding to targeted therapies and requiring individualised treatment plans for each patient [2]. A number of unique asthma phenotypes have been identified by the Global Initiative for Asthma (GINA), including allergic asthma, non-allergic asthma, late-onset asthma, asthma with fixed airflow limitation, and asthma associated with obesity. Phenotypes are categorised by observable traits without any relation to the underlying disease process, which limits their usefulness [3].

There are a number of identified triggers for chronic airway inflammation, including allergens, infections, obesity, hormones, tobacco smoke, exercise, cold air, genetic mutations, and systemic eosinophilia. In order to promote chronic airway inflammation, the immune-pathophysiology of asthma involves the activation of both the innate and adaptive immune systems. Persistent airway inflammation leads to mucus clogging, mucus hypersecretion, airway oedema [4].

Rescue and control therapies are the mainstays of asthma treatment. Control therapy for asthma will be the main topic of this review. Although the GINA has produced recommendations for treating asthma, these recommendations apply to all patients. Target-directed medicines are now accessible for patients with severe, persistent asthma as a result of improved knowledge of underlying pathophysiology and biomarkers [5].

Conclusion

A prevalent diverse disease with a complicated pathogenesis is asthma. All asthma patients can benefit tremendously from individualised, targeted treatment if the immunology of the condition is understood. Furthermore, understanding a patient's endotype might be useful in determining their asthma prognosis and in counselling them on preventative methods. Nonetheless, asthma endotyping has several drawbacks.

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