

Advances and highlights in biomarkers of allergic diseases

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Abstract

Allergic diseases include asthma, atopic-dermatitis, allergic-rhinitis, drug hypersensitivity and food-allergy. During the past years, there has been a global outbreak of allergic diseases, presenting a considerable medical and socioeconomical-burden. A large fraction of allergic diseases is characterized by a type-2 immune response involving Th2 cells, type-2 innate lymphoid cells, eosinophils, mast cells, and M2 macrophages. Biomarkers are valuable parameters for precision medicine as they provide information on the disease endotypes, clusters, precision diagnoses, identification of therapeutic targets, and monitoring of treatment efficacies. The availability of powerful omics technologies, together with integrated data analysis and network-based approaches can help the identification of clinically useful biomarkers. These biomarkers need to be accurately quantified using robust and reproducible methods, such as reliable and point-of-care systems. Ideally, samples should be collected using quick, cost-efficient and non-invasive methods. In recent years, a plethora of research has been directed towards finding novel biomarkers of allergic diseases. Promising biomarkers of type-2 allergic diseases include sputum eosinophils, serum periostin and exhaled nitric-oxide. Several other biomarkers, such as pro-inflammatory mediators, miRNAs, eicosanoid molecules, epithelial barrier integrity, and microbiota changes are useful for diagnosis and monitoring of allergic diseases and can be quantified in serum, body-fluids and exhaled-air. Herein, we review recent studies on biomarkers for the diagnosis and treatment of asthma, chronic-urticaria, atopic-dermatitis, allergic-rhinitis, chronic-rhinosinusitis, food-allergies, anaphylaxis, drug hypersensitivity and allergen-immunotherapy. In addition, we discuss COVID-19 and allergic diseases within the perspective of biomarkers and recommendations on the management of allergic and asthmatic patients during the COVID-19 pandemic.

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