

# Characterizing the Many Faces of Asthma in Adults

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Physicians have attempted to subgroup asthma into different phenotypes for a long time. Consequently, many phenotypes have been suggested according to the clinical features. For example, 'trigger-induced asthma phenotypes' include 1) occupational asthma, 2) cigarette smoke-induced asthma, 3) air pollution-induced asthma, and 4) exercised-induced asthma. 'Symptom-based phenotypes' consist of 1) exacerbation-prone asthma, 2) asthma with persistent airflow limitation, 3) cough-variant asthma, 4) adult-onset asthma, and 5) obese asthma.<sup>1)</sup> Wenzel SE et al. suggested 5 phenotypes of asthma as follows; 1) early-onset allergic asthma, 2) late-onset eosinophilic asthma, 3) exercised-induced asthma, 4) obesity-related asthma, and 5) neutrophilic asthma. This classification differs from the previous ones since pathobiology and biomarkers were considered.<sup>2)</sup>

With improved understanding of inflammatory pathways at molecular level, T2-high and T2-low asthma were defined.<sup>3)</sup> Asthma phenotypes associated with type 2 signatures include allergic asthma, highly eosinophilic asthma despite inhaled corticosteroids (ICS), and type 2 asthma with additional pathways.<sup>4)</sup> This T2-high asthma is attracting the most attention recently due to the introduction of biologic agents blocking the key factors of T2 inflammation pathway, including omalizumab, mepolizumab, reslizumab, and benralizumab. Meanwhile, despite persistent investigation of pathophysiology of non-T2 asthma, non-T2 targeted therapies failed to prove their effects in the clinical trials.

Following the elucidation of molecular phenotypes, omics data have been used for phenotyping asthma.<sup>5)</sup> Rapid development of '-omics' technologies such as proteomics, transcriptomics, metabolomics, metagenomics, as well as genomics made it possible to see what lies beyond the molecular phenotypes. However, there are lack of data and studies using omics so far.

Considering the heterogeneity of asthma, characterizing each patient with various measurements is an important role of clinicians. It will help them better understanding pathologic change of the patient and providing personalized

management.<sup>6)</sup>

## References

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