

## Foreword

# Biomarkers in Asthma and Allergy: Are We There Yet?



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Biomarkers are clinically useful tools to detect exposure to environmental agents, disease susceptibility, state of the disease, or its progression and resistance/response to certain treatment regimens. A useful biomarker should have validated biologic relevance such that it can be used for risk assessment. The utility of a biomarker is based upon its sensitivity, specificity, and biologic relevance. A good biomarker should be stable in the biologic sample, specific for the target tissue, and sensitive to levels of exposure or disease severity. Asthma is a complex polygenic and multifactorial disease. It is unlikely that we will find a single molecule that will satisfy all of these criteria for a biomarker in asthma. Nonetheless, the identification of a biomarker for airway inflammation, airway remodeling, or resistance to treatment protocols would be of great practical value.

Exhaled air and breathe condensate, and sputum represent biologic samples that originate from the lower airways. Hence, these bio-specimens could be of great value for biomarker identification. The progress has been hampered by the lack of sensitive tools to detect minute quantities of the potential biomarkers that are present in these samples. Advanced mass spectrometric technologies are capable of detecting proteins in femto- to atto-molar concentrations. This statement is true only when a protein is analyzed in a relatively pure form. The existing technologies are not quite as

sensitive in detecting small quantities of a protein in the mix of others. The detection of lipids and lipid-derivatives appears more feasible and has made significant progress. Some of these technologies are now being used to probe airway inflammation and the state of the disease. This is a very rapidly growing dynamic field. Dr. Rohit Katial has graciously taken the challenge to update us on emerging biomarkers in asthma and allergy. He has brought together the leaders in the field who are at the forefront of this research. The latest developments are exciting indeed.

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