



Fungal Allergy and Asthma: The Steele Lab

Asthma is a complex condition with multiple underlying causes and high morbidity. One of the contributors to asthma is fungal allergens, which can trigger an asthma attack in patients who are allergic to fungi. The Lab of **Chad Steele** is studying the underlying mechanisms contributing to this association using both patient samples and a specialized murine model. One of the lab's primary areas of focus is the identification of novel biomarkers for fungal asthma susceptibility.

Biomarker Discovery

The Steele Lab is an active participant in the National Asthma Research Network. This is a national program with standardized patient data and sample collection protocols across seven sites in the US. Each site represents a distinct area of expertise within the field. The Lab is analyzing these samples for their reactivity to fungal allergens. Fungal allergens can cause a positive response in approximately 40% of the population, and these aeroallergens can cause an asthma attack. These attacks in fungal allergen-responsive individuals tend to be more severe.

The Lab is investigating novel biomarkers present in fungal positive individuals that can help predict severe asthma attacks. By analyzing both sputum and bronchial alveolar lavage (BAL) samples using a multiplexed Luminex approach, the Lab identified 13 different markers in the BAL patient samples and 16 in sputum. Of these, a small subset overlap. The Lab believes that these biomarkers should correlate with lung function and activity in these patients, and could thus have predictive power in asthma treatment and prevention strategies.

Murine Models of Asthma

Most labs that model asthma in mice use an ovalbumin injected model, which does not accurately mimic the triggers for asthma in humans. The Steele Lab is one of only four labs currently using an aspergillus challenge model, which more accurately recapitulates the course of the condition in humans. It does so because the aspergillus challenge model uses the whole, live organism.

In humans as in the mouse model, there are many different allergens and potential asthma triggers (spores, the organism itself, and assorted shed proteins) – all of which are inhaled. This mouse model yields a reproducible lung phenotype, meaning that it can be used to more accurately assess both potential biomarkers and treatment options for asthma.

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