

POSTER PRESENTATION

Open Access

# Poster 1007: Universal allergen particle generation for inhaled allergen challenges in the fraunhofer environmental challenge chamber (ECC)

Jens M Hohlfeld<sup>1\*</sup>, Katrin Lueer<sup>1</sup>, Heike Biller<sup>1</sup>, Horst Windt<sup>1</sup>, Philipp Badorrek<sup>1</sup>, Meike Mueller<sup>1</sup>, Holger Ziehr<sup>1</sup>, Dietrich Haefner<sup>2</sup>, Norbert Krug<sup>1</sup>, Wolfgang Koch<sup>1</sup>

From 2013 WAO Symposium on Immunotherapy and Biologics  
Chicago, IL, USA. 13-14 December 2013

## Background

Efficacy testing of immunotherapy in field studies is often hampered by variation of airborne allergens. Standardized allergen exposure in challenge chamber settings might overcome aforementioned limitations. However, airborne allergens such as house dust mite (HDM) or cat allergen are not available as standardized source material with distinct particle size. Therefore, we developed a method for universal allergen particle generation and conducted a pilot study to clinically validate this challenge paradigm for house dust mite.

## Methods

House dust mite allergen extract (ALK lyophilised SQ503 Der p, ALK-Abello, Wedel, Germany) was diluted in an aqueous solution of 10% lactose. The solution was spray-dried at various liquid feed rates leading to allergen aerosols with different pre-defined concentrations but a constant mass mean aerodynamic particle diameter of 13.5  $\mu\text{m}$ . Particle size is dependent on the solute (lactose) concentration and can thereby be adjusted accordingly. In a single-blind, five-way cross-over pilot study 18 subjects with allergic rhinitis and sensitization to HDM were allergen-exposed for 4 hours at either 250  $\text{SQE}/\text{m}^3$ , 500  $\text{SQE}/\text{m}^3$ , 1000  $\text{SQE}/\text{m}^3$ , or lactose alone (0  $\text{SQE}/\text{m}^3$ ) seven days apart. The dose of 500  $\text{SQE}/\text{m}^3$  was repeated to investigate reproducibility. Total nasal symptom score (TNSS), anterior rhinomanometry, nasal secretions, exhaled NO, FEV1, and adverse events were assessed prior to and during the exposures.

## Results

Allergen exposure was safe and significantly elicited symptoms of AR compared to room air exposure with a mean total nasal symptom score (TNSS) of  $3.6 \pm 2.0$  (mean  $\pm$  SD) at the highest allergen concentration. Lactose alone did not change TNSS ( $0.7 \pm 0.6$ ) compared to pre-challenge level. Repeated exposure to 500  $\text{SQE}/\text{m}^3$  induced a TNSS which was not different between the two challenge sessions. Objective measures of nasal flow and nasal secretions were in line with clinical symptoms.

## Conclusions

We conclude that this universal allergen particle generation is safe, specific, and reproducible and can therefore be used for efficacy testing of immunotherapy.

## Authors' details

<sup>1</sup>Fraunhofer Institute, Hannover, Germany. <sup>2</sup>Allergopharma GmbH & Co KG, Reinbek, Germany.

Published: 3 February 2014

doi:10.1186/1939-4551-7-S1-P4

**Cite this article as:** Hohlfeld et al.: Poster 1007: Universal allergen particle generation for inhaled allergen challenges in the fraunhofer environmental challenge chamber (ECC). *World Allergy Organization Journal* 2014 **7**(Suppl 1):P4.

<sup>1</sup>Fraunhofer Institute, Hannover, Germany

Full list of author information is available at the end of the article