European Respiratory Society
Annual Congress 2013

Abstract Number: 2038

Publication Number: P3551

Abstract Group: 5.2. Monitoring Airway Disease

Keyword 1: Asthma - diagnosis **Keyword 2:** Breath test **Keyword 3:** No keyword

Title: An electronic nose can distinguish between different asthma phenotypes

Dr. Timm 19111 Greulich greulich@med.uni-marburg.de MD [1], Prof. Peter J. 19112 Sterk p.j.sterk@amc.uva.nl MD [2], David 19113 Hamm David.Hamm@gmx.de [1], Dr. Janine 19114 Koepke koepke@staff.uni-marburg.de [1], Akira 19115 Hattesohl hattesohl@staff.uni-marburg.de [1], Christoph 19116 Nell nell@med.uni-marburg.de [1], Prof. Claus F. 19117 Vogelmeier vogelmei@med.uni-marburg.de MD [1], Dr. Carola 19119 Seifart carola.seifart@staff.uni-marburg.de MD [1] and Dr. Andreas R. 19120 Koczulla koczulla@med.uni-marburg.de MD [1]. [1] Respiratory Diseases, University Hospital Giessen and Marburg, Marburg, Germany and [2] Respiratory Medicine, Academic Medical Center, University of Amsterdam, Amsterdam, Netherlands .

Body: Rationale: As current research in asthma reveals an increasing number of clinically relevant phenotypes, targeted therapy becomes increasingly important. The diagnosis of eosinophilic asthma via sputum induction is technically demanding, cost-intensive and time-consuming. Electronic noses can assess distinct molecular patterns of volatile organic compounds by in exhaled breath of different patient groups. We determined the diagnostic accuracy of an electronic nose in the distinction between patients with eosinophilic asthma, non-eosinophilic asthma and non-asthmatic controls. Study Participants/Methods: We included 40 adult, steroid-naive participants (9 eosinophilic asthma, 11 non-eosinophilic asthma, 10 allergic rhinitis, 10 healthy controls) in this study. Sputum induction, spirometry, measurement of fraction of exhaled nitric oxide (FeNO), and exhaled breath analysis via the Cyranose 320™ was done. For statistical analysis the linear discriminant analysis was performed. Results: We identified a Linear Discriminant function separating the eNose derived volatile organic compound pattern from eosinophilic vs. non-eosinophilic asthma ($p<0.0001$). The corresponding area under the Receiver Operating Curve (AUC, 95%CI, p-value) to predict sputum eosinophilia was 1.0 (0.96 – 1.0; $p<0.0001$; cross validation value 59.1%) and superior to the ability of blood eosinophils (0.93, 0.81 – 1.0; $p=0.0013$) and FeNO (0.82, 0.58 – 1.1, $p=0.0208$). Conclusion: An electronic nose may be able to distinguish exhaled breath from eosinophilic and non-eosinophilic asthma patients who are steroid-naïve. In general, our results provide the opportunity to guide steroid treatment by non-invasive, real time breath analysis.