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Room 5.2 Session 215 08:30-10:30

10:15

OP Oral Presentation : Clinical application of exhaled biomarkers

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Differentiation of chronic obstructive pulmonary disease (COPD) including lung cancer from healthy control group by breath analysis using ion mobility spectrometry

M. Westhoff, P. Litterst, S. Maddula, J. I. Baumbach (Hemer, Saarbrücken, Germany)

Introduction:

Non-invasive methods with potential for diagnosis of lung diseases gain increasing interest. Ion mobility Spectrometry detects volatile analytes within human breath directly. Therefore its usefulness in discriminating COPD patients and healthy persons is tested.

Methods:

Exhaled breath of 132 persons (97 COPD patients [35 without lung cancer, 62 with lung cancer] and 35 healthy volunteers) was investigated using an Ion Mobility Spectrometer (IMS) coupled to a Multi-Capillary Column (MCC) without any pre-separation or pre-enrichment. One hundred four different peaks were considered within the IMS-Chromatograms of the 10 mL breath samples of both groups. A principal component analysis (PCA) of these 104 peaks was applied to find discriminant analytes.

Results:

A single analyte could be identified, that allowed a separation of the healthy persons and the COPD patients (with and without lung cancer). The sensitivity obtained was 60%, the specificity 91%, the positive predictive value 95%. The peak was characterized as cyclohexanone (CAS 108-94-1).

Discussion:

Breath gas analysis using ion mobility spectrometry offers a chance of separating healthy persons and COPD patients. In this study a single analyte (cyclohexanone) at a defined concentration had a high positive predictive value. However, subsequent studies in a greater population are necessary to validate the usefulness of the cyclohexanone peak. Further research is necessary to find peaks with a higher sensitivity.