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Exhaled breath analysis by use of eNose technology: a novel diagnostic tool for interstitial lung disease

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Exhaled breath analysis using eNose technology can accurately discriminate between different ILD subgroups and individual diseases. eNose technology could be a novel diagnostic tool in ILD, enabling timely diagnosis in the future. https://bit.ly/3jJs2hf

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ABSTRACT

Introduction: Early and accurate diagnosis of interstitial lung diseases (ILDs) remains a major challenge. Better noninvasive diagnostic tools are much needed. We aimed to assess the accuracy of exhaled breath analysis using eNose technology to discriminate between ILD patients and healthy controls, and to distinguish ILD subgroups.

Methods: In this cross-sectional study, exhaled breath of consecutive ILD patients and healthy controls was analysed using eNose technology (SpiroNose). Statistical analyses were done using partial least square discriminant analysis and receiver operating characteristic analysis. Independent training and validation sets (2:1) were used in larger subgroups.

Results: A total of 322 ILD patients and 48 healthy controls were included: sarcoidosis (n=141), idiopathic pulmonary fibrosis (IPF) (n=85), connective tissue disease-associated ILD (n=33), chronic hypersensitivity pneumonitis (n=25), idiopathic nonspecific interstitial pneumonia (n=10), interstitial pneumonia with autoimmune features (n=11) and other ILDs (n=17). eNose sensors discriminated between ILD and healthy controls, with an area under the curve (AUC) of 1.00 in the training and validation sets. Comparison of patients with IPF and patients with other ILDs yielded an AUC of 0.91 (95% CI 0.85–0.96) in the training set and an AUC of 0.87 (95% CI 0.77–0.96) in the validation set. The eNose reliably distinguished between individual diseases, with AUC values ranging from 0.85 to 0.99.

Conclusions: eNose technology can completely distinguish ILD patients from healthy controls and can accurately discriminate between different ILD subgroups. Hence, exhaled breath analysis using eNose technology could be a novel biomarker in ILD, enabling timely diagnosis in the future.