A study of breath metabolome in Non-Alcoholic Fatty Liver Disease

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BACKGROUND ANDAIMS

Breath-omics is gaining popularity as a method for non-invasive measure of biomarkers for various diseases. Breath metabolome is a multitude of volatile organic compounds (VOCs) reflecting pathological metabolic processes. The purpose of this study was to compare breath VOCs in patients with non-alcoholic fatty liver disease (NAFLD) and healthy controls.

METHOD

Breath samples were collected from well-characterized NAFLD patients; a) NAFLD cirrhotic (n=15), b) NAFLD non-cirrhotic (n=15) and c) self-declared healthy subjects (n=15). VOCs were identified using mass spectrometry; comprising of abundant and trace compounds. The mass spectra of each compound were matched in the chromatogram and further identified using AMDIS® software. The peak automatically integrated using Xcalibur®. Data were analysed by non-parametric ANOVA (Kruskal-Wallis) and Dunns post-hoc. Receiver Operating Characteristic (ROC) curves were used to determine the diagnostic accuracy of the volatiles compound.

RESULTS

Body mass index adjusted exhaled breath levels of acetone, dimethyl sulphide, d-limonene, were significantly higher (p<0.001, p<0.01, p=0.005) in patients with NAFLD cirrhosis.

D-limonene (AUROC = 0.91) is found to provide the most discriminatory power for NAFLD cirrhosis from healthy. Breath acetone level can distinguish between NAFLD non-cirrhotic & NAFLD cirrhotic; AUROC = 0.88

CONCLUSIONS

Breath VOCs have a promising future as biomarkers for a non-invasive diagnostic and prognostic tool in the management of NAFLD. D-limonene and acetone can identify NAFLD non-cirrhosis from NAFLD cirrhosis with confidence. Future validation of our finding to external cohort is needed.

REFERENCE


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