METABOLOMICS IN THE DIAGNOSIS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A PRELIMINARY REPORT

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Background: Chronic obstructive pulmonary disease (COPD) is a treatable and preventable disease characterized by an enhanced chronic inflammatory response in the airways. Poor prognosis results mainly from lack of biomarkers sufficiently mirroring the course and severity of the disease. Metabolomics is a relatively new diagnostic tool which employs nuclear magnetic resonance and mass spectrometry, together with chemometric analysis. This method allows to measure and analyze metabolites as low molecular compounds fraction MW <1000 Da in various biofluids. **Aim:** Using metabolomic methods, we aimed to discriminate patients with COPD from those with obstructive sleep apnea (OSA). **Material and methods:** Metabolome was assessed in urine and plasma collected from 18 patients (8 males) with COPD and 29 patients (25 males) with obstructive sleep apnea (OSA). The age ranges 40 – 72 mean 62 years and 27 – 69 mean 47 years for the COPD and OSA groups, respectively. In these studies we used NMR spectroscopy as the diagnostic tool. The obtained data were evaluated by advance statistical analysis supported by supervised chemometric PLS-DA and OPLS-DA tools. **Results:** Numerous of low molecular compound has been identified and their holistic quantitative analysis was applied. Our studies have shown that the applied methodology allows to discriminate patients with COPD from the ones with OSA. **Conclusions:** Low molecular compounds, which are substrates for enzymes and products of their actions are reflecting the changes occurring in metabolic pathways of living systems. Observation of these changes between two different states (healthy and sick) of organisms allows to distinguish one from the other. This finding might improve our understanding of molecular mechanisms of the investigated diseases. Used approach is a very promising and non-invasive method for investigating lung diseases, which in the near future may be used in routine diagnostics.