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Title: Proteomics and screening of lung cancer: Biomarkers selection by mass spectrometry and ELISA in the exhaled breath condensate (EBC)

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Body: Background: EBC is a non-invasive sample attractive for screening the non-small cell lung cancer (NSCLC). Aims: To characterize the EBC protein profile in 4 groups: NSCLC, chronic obstructive pulmonary disease (COPD), healthy non-smokers and smokers, to find out disease-specific biomarkers. Method: EBC was collected twice, from 10 subjects in each group. Half of the samples were concentrated by using the POROS R2 resin (Applied Biosystems) and protein profile was determined by mass spectrometry analysis (Maldi Tof-Tof). The remaining samples were analyzed by ELISA. Results: 19 proteins were identified by mass spectrometry. Those suspected to be contaminations (amylases or keratins) were discarded. Three candidates were selected for further analysis based on their role on the defense against the development of NSCLC, the lack of previous publications relating the protein with lung cancer and the availability of commercial ELISA kits. Dermcidin, S100-A9 and Cathepsin G were quantified. Cathepsine G was almost undetectable on control groups and there were no differences between NSCLC and COPD groups (0.32±0.48 vs 0.22±0.24 ng/mL). Dermcidin and S100-A9 concentrations were higher in NSCLC and COPD groups, being the differences statistically significant (Dermcidin, 0.24±0.15 vs 0.32±0.07; S100-A9, 2.68±1.17 vs 4.41±0.76, ng/mL). Conclusions: Cathepsine G seems to be a biomarker specific for NSCLC and COPD but it does not allow the discrimination between the two conditions. Nevertheless, the concentration of Dermcidin and S100-A9 was found to be disease-specific which makes them a very attractive target for the research on these conditions.