Functional regulation in lung cancer from a clinical proteomics point of view

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Abstract

There is an unmet need for an algorithm that allows distinction between mesothelioma, benign changes, viral infections and separating mesotheliomas from other types of epithelial and connective tissue tumors such as for example adenocarcinomas. We foresee that research on lung cancer diagnosis potentially can result in minimizing invasive testing and better classify patient with respect to treatment options at an early stage. Early stage detection is associated with improved patient outcome. To this end, we are working on a proteogenomics based strategy to analyze exosomes from bronchoalveolar lavage (BAL) and pleural effusion. In our recent study applying mass spectrometry on BAL samples [1] three interesting observations were made which suggests that this proposed project will be successful: 1) we found a remarkable overlap in significantly regulated proteins found in BAL with the significantly regulated marker obtained when comparing lung cancer tissue and patient matched normal tissue, 2) we found that the proximity of the extracted BAL seems to affect sensitivity of lung cancer detection and 3) based on the expression level of the identified proteins we concluded that BAL is highly enriched in exosomes. We have now preliminary data based on exosome isolation that confirms that exosomes in BAL have a similar abundance level as exosomes in plasma. Furthermore, our recent preliminary proteomics data from BAL exosomes strongly indicate improved classification potential of exosome proteins. Finally, latest results obtained on computational functional analysis of the data will be presented.

References

[1] A. Carvalho, C. Cuco, C. Lavareda, F. Miguel, M. Ventura, S. Almeida, P. Pinto, T. Tavares de Abreu, L. Vaz Rodrigues, S. Seixas, C. Bárbara, M. Azkargorta, F. Elortza, J. Semedo, J. Field, L. Mota, R. Matthiesen, Bronchoalveolar Lavage Proteomics in Patients with Suspected Lung Cancer. Scientific Reports, , Sci Rep., 7:42190, 2017.