Proteo Vilamoura

Abstract Book



SEProt Sociedad Española de Proteómica

fps French Proteomics Society

PROCURA OMICS PT

Proteo Vilamoura

2nd Joint Meeting of Spanish, French and Portuguese Proteomics Societies

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More than 30 years after the introduction of the word proteomics, which quickly spread through the scientific literature and beyond, the instrumental development, the development of bioinformatics, the integration with other omics, the sharing of data between researchers, the integration with data coming from other scientific activities, allowed an enormous development of knowledge on living organisms (dead or alive) from viruses to humans but also showed new difficulties and most of all created new challenging opportunities. In all human activities where proteins happen or may come to be proteomics either already exist or will certainly be there in the future. Our proteomics meeting is divided into 4 main sessions referring to: technical and methodological aspects; to different applications; its complementarity with other areas and methodologies (named mixomics); and examples of state-of-the-art works. Reference invited speakers were carefully chosen to share and discuss from the most basic aspects to new subjects that most are unaware of. We also want science to be shared by all who want to do so. Small talks, flash talks and of course posters are programmed so that everyone can share and discuss their work and we all learn together.

OCCUPATIONAL SECONDHAND SMOKE EXPOSURE - A PROTEOMIC ANALYSIS

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WHO have stated that near 900 000 deaths per year result from Secondhand Smoke (SHS) exposure. Non-smokers exposed to SHS are at risk to develop tobacco smoke associated diseases and improved risk prediction and understanding of SHS-induced pathogenesis are needed.
We have previously shown that non-smokers workers from a group of Lisbon smoking restaurants presented higher levels of urinary cotinine and changes in their plasma proteome that might be associated with SHS exposure [1]. Herein, to better investigate the molecular biology involved in the cellular response to the SHS, we performed a proteomic study at the upper respiratory level of those occupationally exposed subjects.

In total, 25 Lisbon restaurants agreed to participate. Nasal epithelium and urine samples were collected from their employees (n=52) for proteomics analysis and cotinine evaluation of SHS exposure, respectively. The subjects were classified as never smoker (N), former smoker (F) and smoker (S); exposed (NE=11; FE=10; SE=4) or non-exposed (N=11; F=8; S=8) to SHS. All subjects were healthy and showed no significant differences in parameters like age, time in the workplace, tobacco smoking habits and spirometry evaluation of pulmonary function. Urine cotinine levels showed significantly elevated in the exposed subjects compared to non-exposed, confirming SHS exposure. Nasal epithelium samples were analyzed by shotgun proteomics using an ESI-LTQ-Orbitrap mass spectrometer. The obtained MS data was analyzed by the “PatternLab” software for protein identification. The identified proteins were submitted to the "ClueGO" application of the "Cytoscape" software, for functional annotation & enrichment analyses.

The results indicated that in NE subjects the SHS is associated with the biologic terms of “Lactate dehydrogenase complex” and “Pentose-Phosphatase Shunt”, also with “Glutathione peroxidase activity” and “T- cell apoptotic process”. At the other end the FE subjects presented a specific proteome enriched in biologic information with terms as the “L-Lactate dehydrogenase complex” and the “Peroxisome”. These data suggested that hypoxia and detoxification process seem to be activated in both NE and FE subjects in response to SHS exposure. Biological terms such as “Peripheral T cell lymphoma”, “Central carbon metabolism in cancer”, “Myelodysplastic syndrome”, “Monocyte & Granulocyte & Macrophage & Leukocyte Chemotaxis”, Nucleossome, variant H3.1-H2A2-H2B.1&Others”, and “DNA replication-dependent chromatin assembly” were also identified in FE subjects.
Altogether, these data indicated that the nasal epithelium proteome modulates in response to SHS exposure and cumulative and different biologic processes may be taking place in FE subjects, possibly due to their previous smoking habits, when compared to NE subjects. Further validation studies are needed to the better understanding the SHS exposure-induced mechanisms as risk factors for airway diseases.

1 - Pacheco S.A. *et al*., Effects of occupational exposure to tobacco smoke: is there a link between environmental exposure and disease? J Toxicol Environ Health A., 2013; 76(4-5):311-27.

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