

Combined Proteomic and Metabolomic Analysis Approaches to Investigate the Modification in the Proteome and Metabolome of in vitro Models Treated with Gold Nanoparticles (AuNPs)

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Abstract : Emerging approaches in the area of exposure to nanomaterials and assessment of human health effects combine the use of in vitro systems and analytical techniques to study the perturbation of the proteome and/or the metabolome. We investigated the modification in the cytoplasmic compartment of the Balb/3T3 cell line exposed to gold nanoparticles. On one hand, the proteomic approach is quite standardized even if it requires precautions when dealing with in vitro systems. On the other hand, metabolomic analysis is challenging due to the chemical diversity of cellular metabolites that complicate data elaboration and interpretation. Differentially expressed proteins were found to cover a range of functions including stress response, cell metabolism, cell growth and cytoskeleton organization. In addition, de-regulated metabolites were annotated using the HMDB database. The "omics" fields hold huge promises in the interaction of nanoparticles with biological systems. The combination of proteomics and metabolomics data is possible however challenging.

Keywords : data processing, gold nanoparticles, in vitro systems, metabolomics, proteomics

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