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## **GENOMICS AND PROTEOMICS TECHNIQUES IN NANOPARTICLES STUDIES – NEW APPROACH IN ENVIRONMENTAL RESEARCH**

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### **Abstract**

Environmental research has been significantly enriched by genomic and proteomic methodologies. Particularly in the atmospheric pollution studies, where a variety of environmental hazards act simultaneously and frequently in close interrelationship, only such integrative methods can provide a comprehensive analysis. Nanoparticles are a heterogeneous class of particles, but their health effects have also common aspects. The scope of the article is to present the contribution of genomics and proteomics in extending the knowledge about the biological effects of atmospheric nanoparticles in humans: how they interact with genes and genes' expression, how they affect translation and cell proteome and how they interfere with epigenetic mechanisms. Different methods, with advantages and disadvantages, and main contribution are described. Most studies underline the oxidative stress and the inflammatory mechanisms induced by nanoparticles at the bronchial epithelium level and at the systemic level. Oxidative mechanism is investigated with genomic technics and confirmed in proteomic studies and in epigenetic ones. These techniques have higher sensitivity in identifying parameters related to cytotoxicity of different human cells than other biological measurements and an increasing role in evaluating environmental management and interventions.

*Key words:* biological effect, genomics, nanoparticle, proteomics

*Received: August, 2011; Revised final: September, 2012; Accepted: October, 2012*

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