

Changes in Global DNA Methylation and DNA Damage in Two Tumor Cell Lines Treated with Silver and Gold Nanoparticles

Authors : Marcin Kruszewski, Barbara Sochanowicz, Sylwia Męczyńska-Wielgosz, Maria Wojewódzka, Lucyna Kapka-Skrzypczak

Abstract : Metallic NPs are widely used in a number of applications in industry, science and medicine. Among metallic NPs foreseen to be widely used in medicine are gold nanoparticles (AuNPs) due to their low toxicity, and silver NPs (AgNPs) due to their strong antimicrobial activity. In this study, we compared an effect of AgNPs and gold NPs (AuNPs) on the formation of DNA damage and global DNA methylation and in A2780 and 4T1 cell lines, widely used models of human ovarian carcinoma and murine mammary carcinoma, respectively. The cells were treated with AgNPs coated with citrate (AgNPs(cit) or PEG (AgNPs(PEG), or AuNPs. A global DNA methylation was investigated with ELISA, whereas the formation of DNA damage was investigated by a comet +/- FPG. AgNPs decreased global DNA methylation and increased the formation of DNA lesions in both cell lines. The effect was dependent on the type of NPs used, it's coating, and cell line used. In conclusion, the epigenetic and genotoxic effects of NPs strongly depends on NP nature and cellular context. Epigenetic changes observed upon the action of AgNPs may play a crucial role in NPs-induced changes in protein expression.

Keywords : DNA damage, gold nanoparticles, methylation, silver nanoparticles

Conference Title : ICNN 2019 : International Conference on Nanotechnology and Nanomedicine

Conference Location : Venice, Italy

Conference Dates : August 13-14, 2019