**In vitro** Toxicological Effects of Metallic Nanoparticle-Chemoterapeutic Formulations

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Introduction: Platinum-based anticancer drugs are one of the most commonly used in a broad spectrum of solid tumors, including head and neck, cervical, testicular, prostrate, breast and ovarian cancers. The pharmacological activity of these drugs is attributed to its capability to form adducts in the DNA strands. This also causes severe side-effects that can restrict its long-term clinical therapy, which is mainly due to induction of oxidative stress. The use of metallic nanoparticles (MNP) includes modern biomedical studies, comprising genomics, clinical analysis, biosensors and treatment of cancer cells by photothermolysis. The aim of this study was to evaluate the cytotoxic effects of MNP associated or not with a platinum-based drug in V79 cells.

Material and Methods: Two biomarkers were used for relative toxicity assessment: 3-(4,5-dimetiltiazol-2-yl)-2-5-difenil-2H tetrazolium bromide (MTT) reduction and neutral red uptake (NRU) after 24h of treatment with the studied substances (MNP, Pt-Drug and MNP-Pt-Drug). Results and Discussion: MNP were not cytotoxic in the concentrations used (0 – 32 µg/mL). The IC$_{50}$ values, concentration that decreased 50% of the V79 cells viability, of Pt-Drug were 1 and 10 µg/mL as determined by NRU and MTT assays, respectively. However these results were changed when the drug was associated with MNP (IC$_{50}$ of 12 and 2 µg/mL as determined by NRU and MTT assays, respectively). Conclusion: The association of MNP and the drug based on platinum probably induced the cell death by mitochondrial pathway, indicating that this formulation could increase the drug activity on tumor cells.

Key words: cytotoxicity; V79 cells; metallic nanoparticles.

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