Assessment of cytotoxicity and genotoxicity in human glial cells exposed to platinum nanoparticles

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Platinum (Pt) is a noble metal, biologically inert and non-allergenic, which makes it exceptionally valuable for industrial, medical, and jewellery applications. Nowadays, platinum nanoparticles (PtNP) are playing an important role not only in the field of nanotechnology but also in nanomedicine, being promising tools for therapeutic and diagnostic applications, or as drug delivery systems, among others. This is due to their physicochemical properties (i.e. catalytic properties, high stability, etc.) and their ability to interact with biological systems. Hence, it is crucial to understand their toxicity profile, as well as their potential effects on genetic material and cellular repair capacity, to ensure a safe use for both patients and consumers. The aim of this work was to assess the potential cytotoxicity and genotoxicity induced by PtNP exposure *in vitro* in A172 glioblastoma cells. Cytotoxic effects were addressed by evaluating cellular membrane disruption and viability decreases in the presence of PtNP, whereas primary DNA damage and effects on DNA repair capacity were assessed by employing the Comet assay and the Challenge-comet assay, respectively. A range of concentrations and different exposure periods were tested in all cases. Also, cellular uptake of PtNP was assessed before the evaluation of toxic effects to verify their ability to enter the cells. Results obtained showed no significant cytotoxicity or genotoxicity under any of the conditions evaluated, confirming the biocompatibility of PtNP previously reported in the literature for other cell types, and supporting their use in biomedical applications. Still, further analysis must be undertaken to completely rule out any other potential harmful effects and to fully understand the biological behaviour of these nanoparticles.

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