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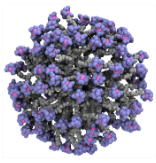

COST ACTION CA 17140
NANO2CLINIC
CANCER NANOMEDICINE - FROM THE BENCH TO THE BEDSIDE

2nd CA17140 STSM VIRTUAL CONFERENCE

BOOK OF ABSTRACTS

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Biocompatibility evaluation of CeO_2 nanoparticles to be employed as nanodrugs in brain cancer nanomedicine

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Cerium dioxide nanoparticles (CeO_2NP) have recently gained attention for their unique structure-dependent properties, antioxidant enzyme-like behaviour, ROS scavenging activity and great potential for biomedical applications. In addition to their antioxidant and anti-inflammatory activity, CeO_2NP are also known to exhibit anticancer potential, providing an attractive opportunity for use in cancer therapy, as a pharmacological agent and/or in drug/gene delivery systems [1]. Therefore, the main objective of this STSM was to evaluate the cytotoxic and genotoxic effects on human glioblastoma A172 cells exposed for 3, 24 and 48h to CeO_2NP (1-100µg/ml), to verify their safety to be used as possible nanomedicines for brain cancer treatment, specifically glioblastoma [2]. In addition, cell-specific differences in nanoceria effect were evaluated by comparing the results obtained with those observed in human neuronal SH-SY5Y cells exposed under the same experimental conditions. After carrying out the physicochemical characterization and analysing the cellular uptake of the CeO_2NP, potential alterations in cell viability (MTT assay) and induction of DNA double-strand breaks (γH2AX assay) caused by the exposure were determined. The possible NP interference with assay methodologies was previously addressed and eliminated when necessary. Results obtained showed that, although there was a significant dose- and time-dependent internalization of NP by both cell types, nanoceria induced scarce cytotoxicity or genotoxicity in both cell lines, being restricted to the highest doses and longer exposure time tested. In general, data obtained suggest a high biocompatibility of CeO_2NP under the tested conditions, except for glioblastoma cells exposed for 48h from 25 to 100µg/ml. These results provide a better understanding of the CeO_2NP interaction with nervous system cells and their possible adverse effects. However, further studies are necessary to delve into the differential behaviour of these NP depending on the nervous cell type tested.

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