HUMAN ASTROCYTES DNA REPAIR COMPETENCE: INFLUENCE OF IRON OXIDE NANOPARTICLE SURFACE COATING

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In recent years, iron oxide nanoparticles (ION) have gained importance in diagnosis and treatment of human nervous system pathologies, and many of them are able to cross the blood-brain barrier. However, ION safety is not entirely clear yet. Studies describing possible genotoxic damage or repair alterations induced by ION exposure are still very scarce, especially in nervous cells. Moreover, it is known that ION surface coatings may modify their advantageous features as well as their potential toxicity. The aim of this study was to assess the possible effects of ION on DNA repair ability, and the influence of nanoparticle surface coating. DNA repair competence assay, based on alkaline comet assay, was performed in human astrocytes (A172) treated with silica-coated (S-ION) and oleic acid-coated (O-ION) ION in the presence and absence of serum, using H_2O_2 as challenging agent. DNA damage detected immediately after challenging the cells with H_2O_2 (before repair) was compared with residual damage after a 30 min incubation-period (after repair). Incubations with ION were conducted before inducing DNA damage (3 or 24h), during damage induction, or during the repair period. Data obtained showed a significant decrease in DNA damage assessed after the repair period for both ION tested, regardless if exposure was performed prior H_2O_2 treatment, in co-exposure, or during the subsequent DNA repair period. Results obtained for the two different surface coatings tested were very similar, indicating absence of influence of this feature. Presence of serum did not affect the results at any condition either.

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