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P80. GENOTOXICITY OF IRON OXIDE NANOPARTICLES IN HUMAN LYMPHOCYTES BY SISTER CHROMATID EXCHANGES

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In recent years, iron oxide nanoparticles (Fe_2O_3 NPs) have been widely used in biomedical applications, for both diagnosis and therapy, due to their unique magnetic properties. Although the wide spread using, the impact of Fe_2O_3 NPs on the environment and on biological species is not well understood. In this study, genotoxic effects of Fe_2O_3 NPs have been determined in human peripheral lymphocytes in vitro by using sister chromatid exchange (SCEs) assay. Peripheral lymphocytes were incubated with four different concentrations (39,062; 78,125; 156,25 and 312,5 µg/mL) of Fe_2O_3 NPs (Sigma-Aldrich, <50 nm, spherical) for 24 and 48h. The results showed that the frequency of SCEs increased at all the treatment times dose dependently (r=0,85 for 24h; r=0,86 for 48 h), however, this increase was significant only at the highest concentration (312,500 µg/mL) at 24 h, and at the two highest concentrations (156,250 and 312,500 µg/mL) at 48h. The formation of SCEs has been correlated with recombinational repair and the induction of point mutations, gene amplification and cytotoxicity. This effect may occur from oxidative stress that has been produced by reactive oxygen species (ROS). Long term exposure to these nanoparticles could potentially result in particle accumulation and subsequently induce acute or chronic toxicity. This may provoke a range of long term effect involving mutagenic, carcinogenic or teratogenic influence on the organism.

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