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THE NITROXIDE ANTIOXIDANT TEMPOL AFFECTS METAL-INDUCED CYTO- AND GENOTOXICITY IN HUMAN LYMPHOCYTES *in vitro*

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Stable, membrane-permeable nitroxide free radicals have been reported to possess antioxidant activity in various experimental systems while, in parallel, they have been considered to be evidently harmful oxidants. The aim of this study was to evaluate the role of the piperidine nitroxide, 4-hydroxy-2,2,6,6-tetramethylpiperidine-1-oxyl (Tempol) in the modulation of cyto- and genotoxicity in human lymphocytes *in vitro* by cadmium and chromium, which at least in part, depend on reactive oxygen species formation. Cytokinesis-block micronucleus (CBMN) assay as an estimate of generation of micronuclei (MN), nuclear division index (NDI) and percentage of apoptotic and necrotic cells after exposure of human lymphocytes to Cd(II), Cr(III) and Cr(VI) or coincubation with these metals and Tempol were assessed. We found a significant ability of 5 to 50 μM Tempol to diminish toxic effects of the agents tested. In every system studied, Tempol decreased micronuclei frequency, percentage of apoptotic and necrotic cells and increased nuclear division index ($p < 0.05$). We observed adverse effects when 0.1 to 1 mM Tempol alone was used: inhibition of cell growth, induction of apoptotic and necrotic cell death and chromosomal damage ($p < 0.05$). Collectively, we demonstrated that Tempol can be considered as both a potent antiapoptotic and antigenotoxic, and a cytoto-xic and clastogenic agent depending on the concentration applied.