

**Cadmium chloride-induced oxidative stress and DNA damage  
in the human Jurkat T cell line is not linked to intracellular  
trace elements depletion**

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**Abstract :**

Cadmium (Cd) is a widespread environmental contaminant. Cd affects the cellular homeostasis and generates damage via complex mechanisms involving interactions with other metals, induction of oxidative stress and apoptotic or necrotic cell death, depending on the cell type and the concentration. The goal of the present study was to investigate the effect of exposure to CdCl<sub>2</sub> on the intracellular trace elements levels, the antioxidant enzyme activities and on DNA damage in the Jurkat T cell line. Cells were exposed to 5, 25 and 50 µM of CdCl<sub>2</sub> for 24 h.

Cd significantly reduced the viability of Jurkat T cells and induced a dose-dependent increase in DNA damage with statistically significant differences relative to controls ( $p < 0.001$ ); the superoxide dismutase and glutathione peroxidase activities were significantly decreased. Lipid peroxidation and protein carbonyl levels were significantly increased while glutathione and the total intracellular sulfhydryl groups were decreased showing clearly that an oxidative stress was generated by Cd. Surprisingly the treatment with Cd induced a significant increase in the intracellular levels of all the trace elements measured.

The results indicate that cellular pro-oxidative stress induced by Cd is most likely mediated by disruption of redox homeostasis associated to a mishandling of redox-active transition metals and causes lipid and protein oxidation and oxidative DNA damage in Jurkat T cells.

**Keywords** : Cadmium; Trace elements; DNA damage; Jurkat T cells; Oxidative stress; Antioxidant enzyme.

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