Evaluation of toxicity and mutagenicity of metals in the Yeast Cells

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Metal-induced toxicity and carcinogenicity, with an emphasis on the generation and role of reactive oxygen species, is a crucial point in the understanding of various diseases. In the present study, we investigated the toxicity of Cu^{2+}, Cr^{3+}, Cd^{2+}, Ni^{2+} and Zn^{2+} using the yeast *Saccharomyces cerevisiae* as experimental model. Only 50% of cells survived 40 µM Cd^{2+}, while higher concentrations were necessary for the other metals to decrease cell viability. Moreover, the highest percentage of petite mutants and lipid peroxidation increase were obtained when cells were incubated with Cd^{2+}. After 24 h of exposure to Cd^{2+}, yeast cells had absorbed nearly 40% of the total content of metal, while the amount of the other metals absorbed was higher, indicating that cells are better adapted to control the homeostasis of Cu^{2+}, Cr^{3+}, Ni^{2+}, and Zn^{2+}. To check the action of metals on the activity of p53, the FASAY assay was applied. Mutations in the p53 gene are implicated in the pathogenesis of half of all human tumors. Cd^{2+} produced the highest rate of mutation of p53, followed by Cr^{3+} and Cu^{2+}. Based on these results it was concluded that Cd^{2+} is the most toxic and carcinogenic among the metals tested.