Effects of Zinc Induced Glutathione Reductase Inhibition in Neural Cells.

Souza, L.F. ¹, Mitozo, P.A. ², Fesch, S. ¹, Loch-Neckel, G. ³, Uchôa, M.F. ¹, Dafré, A.L. ¹

¹Departamentos de Bioquímica, ²Ciências Fisiológicas e ³Farmacologia; CCB, UFSC

Zinc can inhibit glutathione reductase (GR) and thioredoxin reductase (TrxR), which are involved in peroxide detoxification, and therefore may cause cells to be more susceptible to oxidative damage and inducing cell death. In this study we compare the effects of zinc treatment in the peroxide consumption rate and cell viability parameters in rat glioma C6 and mouse neuroblastoma N2a cells. A 30 minutes incubation with ZnCl₂ (100µM) decreased the GR activity in N2a (-30%) and C6 cells (-77%) and TrxR activity in C6 cells (-42%) and afterward cells were challenged with 100µM H₂O₂ or cumene hydroperoxide (CHP) for 60 min. In N2a cells, ZnCl₂ decreased H₂O₂ consumption rate and increased the susceptibility to H₂O₂. In C6 cells, however, ZnCl₂ decreased the CHP consumption and increased the susceptibility to both peroxides (H₂O₂ and CHP). These results suggest that the decrease in peroxides consumption rate may contribute for the toxicity of zinc, but other effects of zinc, not related to GR and TrxR inhibition, seem to be more relevant for its toxicity.

Key words: Zinc, Peroxide, Glutathione, Thioredoxin.
Supported by: CNPq, Fapesc, IBN-net and INCT: Neurotoxicidade e Neuroproteção