

MEETING ABSTRACTS

STUDYING CADMIUM NEUROTOXICITY *IN VITRO*

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Cadmium is a toxic transition heavy metal commonly found in the environment and its occurrence is mainly conditioned by agricultural and industrial production. Increased exposure to cadmium, especially because of its accumulation in organisms, causes damage of kidney, liver, and bones. Intracellularly, there are proteins, metallothionines, that are actively involved in the detoxification of cadmium by its uptake. In response to increased ROS production after exposure to cadmium, the Nrf2 protein, which modulates glutathione synthesis, is activated (1). The activation rate of Nrf2 protein depends on the concentration of cadmium in a certain time interval (2).

In our work, we focused on testing selected concentrations of cadmium chloride (5-100 μM) in SH-SY5Y neuronal cells *in vitro*. To describe the cellular toxicity, we used a spectrofluorimetric method to determine the intracellular concentration of glutathione (GSH) using monochlorobimane (3) in selected time intervals (1-24 hours). The results suggested that especially at concentrations under 50 μM CdCl_2 , there is a transient increase in intracellular GSH levels relatively to untreated cells. A significant increase in GSH concentration up to 150% was detected in 5-50 μM CdCl_2 treated cells after 24 hours.

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References

1. Genchi G, Sinicropi MS, Lauria G, Carocci A, Catalano A. The Effects of Cadmium Toxicity. *Int J Env Res Pub He.* [Review]. 2020 May 26;17(11).
2. He X, Chen MG, Ma Q. Activation of Nrf2 in defense against cadmium-induced oxidative stress. *Chem Res Toxicol.* 2008 Jul;21(7):1375-83.
3. Capek J, Hauschke M, Bruckova L, Rousar T. Comparison of glutathione levels measured using optimized monochlorobimane assay with those from ortho-phthalaldehyde assay in intact cells. *J Pharmacol Tox Met.* 2017 Nov;88(Pt 1):40-5.