NEUROPROTECTIVE EFFECT OF DIPHENYL DISELENIDE IN MICE BRAIN METHYLMERCURY TOXICITY

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Up-to-now, there are no effective treatments that completely abolish the methylmercury (MeHg)-induced neurotoxicity. Therefore, our objective was to investigate the effect of chronic subcutaneous administration of diphenyl diselenide $(PhSe)_2$, an antioxidant selenium compound, on mitochondrial energy metabolism, oxidative stress parameters, cell proliferation, apoptosis and brain mercurial deposition in MeHg-poisoned mice. Adult male mice were orally treated with MeHg (40mg.L^{-1} in drinking water) and $(PhSe)_2$-subcutaneously injected (5 µmol.kg^{-1}) during 21 days. Control animals were run in parallel. The investigated parameters were assessed spectrophotometrically, by immunohistochemistry or by autometallography methods. $(PhSe)_2$ significantly prevented the inhibition elicited by MeHg on the activities of the respiratory chain complexes and creatine kinase, and on the increased TBA-RS levels. On the other side, $(PhSe)_2$ was not able to prevent the MeHg-induced reduction of GPx and increased GR activities. In addition, no changes were observed in apoptosis or cell proliferation parameters. Finally, $(PhSe)_2$ was able to avoid the brain metal deposition. Altogether, these data provide evidence for the first time, that the inhibitory effect of MeHg poisoning on mitochondrial energy metabolism might be prevented by using the seleno compound. This strongly suggests that $(PhSe)_2$ could be considered as a neuroprotective agent in MeHg-induced brain poisoning, probably because of the highly nucleophilic activity of its reduced form which could remove MeHg and/or by its antioxidant properties.

Keywords: methylmercury, diphenyl diselenide, mitochondria

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