Protective effect of diphenyl diselenide against quinolinic acid-induced excitotoxicity in hippocampus slices of rats

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Quinolinic acid (QA), an endogenous metabolite of L-tryptophan in the kynurenine pathway, has been proven to be toxic to the CNS, and this feature has been mostly explained by its ability to over-activate NMDA receptors (NMDAr) that can cause excitotoxicity through elevation of cytosolic concentrations of free Ca^{2+} and ATP exhaustion. However, the exact mechanism of neurotoxicity is not completely understood, but it is believed that oxidative stress plays an important role. In view of this, antioxidant compounds may protect the damage caused by QA. Recent data from our laboratory have demonstrated that diphenyl diselenide ($(PhSe)_2$), the simplest diaryl diselenides, present antioxidant activities in different experimental models. In this way, we have tested the antioxidant capacity of $(PhSe)_2$ in QA-induced free radical formation in hippocampus' slices of rats. The results presented in this study have showed that glutamate uptake have increased into hippocampus slices, Our results are in agreement with a previous study that indicated that seizures induced by QA occur by stimulation of glutamate uptake into synaptic vesicles. The diphenyl diselenide presented neuroprotective activity against reactive oxygen species generated by the QA, expressive results obtained compared to the well-known antioxidant guanosine, a purine base with modulating properties in the glutamatergic system. In conclusion, this study provided additional evidence of the role of $(PhSe)_2$ to protect the rats hippocampus' slices against the accumulation of oxidative stress generated by QA and these findings may be relevant for further testing.

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