Effect of Newly Synthesized Oximes on Rat and Human Cholinesterases, a Comparative Study with Usual Oximes

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Methamidophos (Meth) is a high-toxicity organophosphorus compounds. That substance is responsible to inactive the AChE and this invoke an accumulation of acetylcholine, causing a cholinergic crisis. As a treatment, oximes are used to promote the AChE reactivation. So, our objectives are to test the protective/reactive power of pralidoxime, obidoxime and two newly synthesized oximes on methamidophos-inhibited cholinesterases from different sources. For this, we used hemoglobin-free erythrocyte ghosts and brain of Wistar rats to examine AChE activity and human plasma to assay butyrylcholinesterase activity. These systems were exposed to oximes into two different assay conditions: protection or reactivation on Meth-induced inhibition. Our results show that Meth induced the inhibition on both cholinesterases, and pralidoxime was able to significantly protect/reactivate the methamidophos-induced AChE inhibition from rat brain. However, oxime 1 just protected the brain AChE-inhibition. On erythrocyte ghost AChE, all tested oximes protected against the inactivation, but just pralidoxime and obidoxime were able to revert the inhibition caused by Meth. In respect to BChE, only oxime 1 was able to protect and the oxime 2 was capable to revert the enzyme. In conclusion, our work shows that the newly synthesized oxime 1 had a protective effect on cholinesterases being a promissory compound. The classical oxime pralidoxime shows to be a potent protector/reactivator of Meth-inhibited AChE from different sources, but failing in restore the BChE activity.