J Med Microb Diagn 2017, 6:4 (Suppl)
DOI: 10.4172/2161-0703-C1-015

Phosphylated oximes increase organophosphate toxicity

Sarah Eysoldt
Florida International University, Florida

Oximes are small chemical compounds utilized as treatments for organophosphate toxicity. Organophosphorous nerve agents prevent the enzyme acetylcholinesterase from performing its function- breaking down the neurotransmitter, acetylcholine. Nerve agents inhibit acetylcholinesterase by phosphylation. Oximes dephosphylate acetylcholinesterase, restoring normal function. When this takes place, the end result is a potentially fatal by-product known as a phosphylated oxime. Phosphylated oximes may be dangerous, because they can inhibit acetylcholinesterase more potently than organophosphates; resulting in toxicity rather than a cure. The objective of this study is to evaluate inhibitory capacity and the toxicity of phosphylated oximes to mammalian cells. The series of experiments conducted involved varying amounts of different oximes (K027, 2-Pralidoxime, etc.) and organophosphates (asinphos, dicrotophos, etc.) on NIH-3T3 cells, and SH-SY5Y cells. These experiments included: in-cell westerns, colorimetric assays, flux analysis, mass spectrometry, and a novel on-cell western blot. These experiments will examine the contributions of oximes, organphosphates, and the combination of both chemicals on acetylcholinesterase function and off-target toxicity. The results of this study suggest that the combination of nerve agents and oximes increases toxicity within neuronal cells by allowing the ability to permeabilize the cell membrane and disrupt normal functioning. All experiments conducted are indicative that the treatment method of oximes is deadly, more so than nerve agents alone. From these results, it can be determined that oximes are not a safe and effective treatment method for organophosphate toxicity. The findings in this study have the potential to change how organophosphate intoxication is treated.

seysosarah@gmail.com