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LETTERS

Role of Acetylcholinesterase (AChE) reactivators in the treatment of Organophosphorus poisoning: *in vivo, in vitro,* and *in silico* studies

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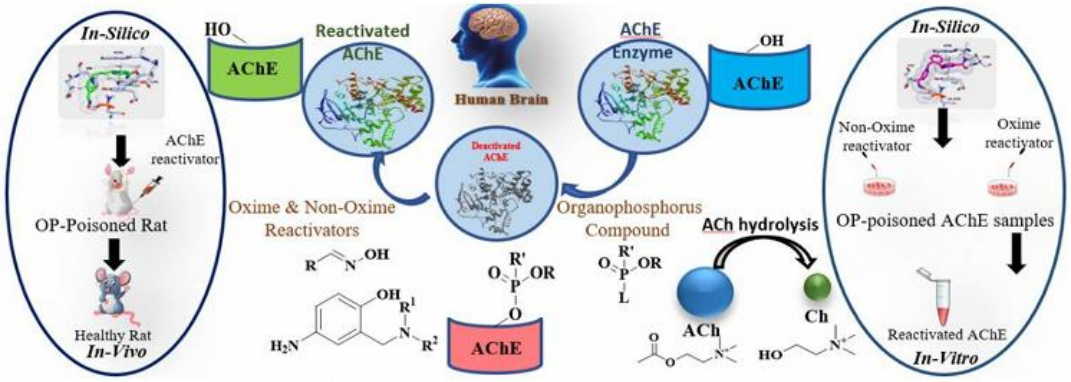
Review

ABSTRACT



Chemical warfare agents (CWAs), especially organophosphorus (OP) compounds, are known for their extreme toxicity causing inhibition of acetylcholinesterase (AChE) enzyme activity due to covalent phosphorylation. This leads to the functional impairment of muscarinic nicotinic acetylcholine receptors, resulting in severe ill effects that ultimately lead to death. For OP poisoning, AChE reactivators play a crucial role in the treatment process. Among several AChE reactivators, oxime reactivators are mainly employed for treating OP intoxication. Nevertheless, these are associated with certain drawbacks, such as their toxic effects, low blood-brain barrier (BBB) penetration, less reactivation in the central nervous system (CNS), and inefficiency towards all nerve agents, and AChE. As a result, new therapeutic strategies are required. Recent attempts are focused on the design and synthesis of uncharged oxime or non-oxime reactivators which can overcome the limitations of oxime-based reactivators. A novel class of non-oxime reactivators is gaining interest, including compounds like Mannich phenols, chloroquine, and some general bases. This review is a novel attempt to incorporate