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Radiolabelled Soman Binding to Sera from Rats, Guinea Pigs and Monkeys

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Highlights:

- Serum carboxylesterase varies between mammalian species.
- The concentration of serum carboxylesterase in mammalian species can affect concentration of soman in circulation.

Abstract

Soman is a highly toxic organophosphorus chemical warfare compound that binds rapidly and irreversibility to a variety of serine active enzymes, *i.e.,* butyryl- and acetyl-cholinesterases and carboxylesterase. The *in vivo* toxicity of soman has been reported to vary significantly in different animal species, such as rats and guinea pigs or non-human primates. This species variation makes it difficult to identify appropriate animal models for therapeutic drug development under the US Food and Drug Administration (FDA) Animal Rule. Since species variation in soman toxicity has been correlated with species variation in serum carboxylesterase, we undertook to determine if serum from guinea pigs, rats and non-human primates bound different levels of soman *in vitro* in the presence of equimolar concentrations of soman.

Our results demonstrated that the amount of soman bound in the serum of rats was 4 uM, but essentially null in guinea pigs or non-human primates. The results strongly correlate with the presence or absence of carboxylesterase in the serum of animals and the difference in the toxic dose of soman in various species. Our results support prior