Inhibition of cholinesterase activity by two methylacridinium compounds

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9–Azido–10–methylacridinium methosulphate and 9-chloro-10-methylacridinium methosulphate are both monoquaternary ammonium compounds which are hydrolysed in aqueous or alcohol solvents. (Mair & Stevens, 1972). Both compounds have been shown to produce toxic effects in mice which suggest that death may occur as a result of inhibition of cholinesterase enzymes. The present experiments were therefore performed to determine whether these compounds inhibited cholinesterase *in vitro* and also to observe the effect of hydrolysis of the compounds on any inhibition of cholinestrase activity. I_{50} values were determined for both the azido and the chloro compound against purified acetylcholinesterase (AChE) from bovine erythrocytes, purified cholinesterase (ChE) from horse serum and against cholinesterase enzymes from rat brain homogenate. Acetylcholine (ACh) acetyl-β-methylcholine (Ac-β-MeCh) and butyrylcholine (BuCh) were used as substrates and the results are shown in Table 1.

Table 1. I_{50} *values as a molar concentration for the inhibition of cholinesterase activity by azido and chloro methylacridiniums.*

Enzyme	Methylacridinium Azido	Chloro	Substrate
AChE, Bovine erythocytes	$2{\cdot}9 \times 10^{-5}$	$5{\cdot}5 \times 10^{-3}$	ACh
ChE, Horse serum	$1{\cdot}9 \times 10^{-6}$	$3{\cdot}3 \times 10^{-4}$	ACh
	$4{\cdot}2 \times 10^{-6}$	$1{\cdot}2 \times 10^{-3}$	ACh
Rat brain homogenate	$3{\cdot}6 \times 10^{-6}$	$1{\cdot}0 \times 10^{-3}$	Ac-β-MeCh
	$1{\cdot}5 \times 10^{-6}$	$4{\cdot}4 \times 10^{-4}$	BuCh

The method used for determination of cholinesterase activity is a modification of the radiochemical method of Siakotos, Filbert & Hester (1969). The azido compound was shown to be a much more effective anticholinesterase than the chloro methylacridinium and this correlated well with the *in vivo* toxicity of the compounds.

REFERENCES

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The effect of hydrotropic salts on the stability of liquid crystalline systems

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A study has been undertaken of the interaction between some short chain quaternary ammonium salts (hydrotropes) and liquid crystalline systems composed of surfactant + water + amphiphile. Photomicrography revealed progressive fragmentation of the liquid crystalline structure (peptization) which in almost all cases resulted in the formation of isotropic liquid (inverted micellar structure) and finally two isotropic liquids in equilibrium. Using the phase nomenclature of Lawrence (1961):

$$100\%\ \mathrm{LC} \rightarrow \mathrm{LC} + \mathrm{L_2} \rightarrow 100\%\ \mathrm{L_2} \rightarrow \mathrm{L_1} + \mathrm{L_2}$$

Some results are presented in Table 1 for an initial 100% LC system (focal conic structure) composed of 15% w/w n-hexadecyl trimethylammonium bromide + 70% w/w water + 15% w/w n-hexanol at 27·5°. Peptization concentrations, expressed as moles of hydrotrope per 100 g liquid crystal, represent the minimum quantity necessary to achieve the 100% L_2 state (mean of three determinations).