Suramin protects the murine motor nerves from the toxic effects of presynaptic Ca\textsuperscript{2+} channel inhibitors

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Abstract

The purpose of this study is to investigate whether suramin is capable of preventing the neurotoxic effects of Ca\textsuperscript{2+} channel inhibitors at the presynaptic sites. Mouse diaphragm and triangularis sterni preparations were used for this study in order to measure the muscle tension and nerve terminal Ca\textsuperscript{2+} current, respectively. Both \(\omega\)-conotoxin MVIIIC and \(\omega\)-agatoxin IVA markedly inhibit the nerve-evoked muscle contractions as well as the nerve terminal Ca\textsuperscript{2+} current respectively. Pretreatment with suramin (0.3 mM) significantly reduced the inhibitory effect of nerve-evoked muscle contractions and Ca\textsuperscript{2+} current induced by either \(\omega\)-conotoxin MVIIIC or \(\omega\)-agatoxin IVA but not that induced by the non-selective Ca\textsuperscript{2+} channel blocker, Cd\textsuperscript{2+}. Neither suramin nor Ca\textsuperscript{2+}-channel toxins significantly affect Na\textsuperscript{+} and K\textsuperscript{+} currents of the nerve terminals. These findings indicate that suramin selectively interferes the action of presynaptic Ca\textsuperscript{2+} channel neurotoxins and thus reduces their depressant effects on the muscle contractions. The implication of these findings is that suramin and its derivatives may potentially become useful agents in management of intoxication of Ca\textsuperscript{2+} channel neurotoxins. © 2000 Elsevier Science Ireland Ltd. All rights reserved.

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