



## Inhibition of PaCaMKII-E isoform in the dorsal unpaired median neurosecretory cells of cockroach reduces nicotine- and clothianidin-induced currents

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Résumé en  
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Cellular responses to Ca(2+) require intermediary proteins such as calcium/calmodulin-dependent protein kinase II (CaMKII), which transduces the signal into downstream effects. We recently demonstrated that the cockroach genome encodes five different CaMKII isoforms, and only PaCaMKII-E isoform is specifically expressed in the dorsal unpaired median neurosecretory cells. In the present study, using antisense oligonucleotides, we demonstrated that PaCaMKII-E isoform inhibition reduced nicotine-induced currents through alpha-bungarotoxin-sensitive and -insensitive nicotinic acetylcholine receptor subtypes. Specifically, PaCaMKII-E isoform is sufficient to repress nicotinic current amplitudes as a result of its depression by antisense oligonucleotides. Similar results were found using the neonicotinoid insecticide clothianidin, which acted as a full agonist of dorsal unpaired median neuron nicotinic acetylcholine receptors. Clothianidin current amplitudes are strongly reduced under bath application of PaCaMKII-E antisense oligonucleotides but no significant results are found with alpha-bungarotoxin co-applied, demonstrating that CaMKII-E isoform affects nicotine currents through alpha-bungarotoxin-sensitive and -insensitive receptor subtypes whereas clothianidin currents are reduced via alpha-bungarotoxin-insensitive receptors. In addition, we found that intracellular calcium increase induced by nicotine and clothianidin were reduced by PaCaMKII-E antisense oligonucleotides, demonstrating that intracellular calcium increase induced by nicotine and clothianidin are affected by PaCaMKII-E inhibition. Cellular responses to Ca(2+) require intermediary proteins such as calcium/calmodulin-dependent protein kinase II (CaMKII). We recently demonstrated that the cockroach genome encodes five different CaMKII isoforms and only PaCaMKII-E isoform was specifically expressed in the dorsal unpaired median neurosecretory cells. Here we show that specific inhibition of PaCaMKII-E isoform is associated with a decrease in nicotine- and clothianidin-induced currents. In addition, analysis of calcium changes demonstrates that PaCaMKII-E inhibition induces a decrease in intracellular calcium concentration.

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