

Long-lasting, reversible and non-neurotoxic inactivation of hippocampus activity induced by neosaxitoxin

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© 2018 Elsevier B.V. Background: Neosaxitoxin (NeoSTX) and related paralytic shellfish toxins have been successfully used as local anesthetic and muscle relaxants to treat a variety of ailments. The primary mechanism of action of these toxins occurs by blocking voltage-gated sodium channels with compounds such as TTX, lidocaine, or derivatives. However, most of these non-classical sodium channel blockers act with a reduced time effect as well as ensuing neurotoxicity. New method: In this report, we show that the use of local NeoSTX injections inactivates the hippocampal neuronal activity reversibly with a long-term dynamics, without neuronal damage. Results: A single 10 ng injection of NeoSTX in the dorsal CA1 region abolished for up to 48 h memory capacities and neuronal activity measured by the neuronal marker c-fos. After 72 h of toxin injection, the animals fully recover their memory capacities and hippocampal neuronal activity. The histological inspection of NeoSTX injected