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Neurotoxicity of Lindane and Picrotoxin: Neurochemical and Electrophysiological Correlates in the Rat Hippocampus In Vivo*

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In the present study, we compared in vivo changes of extracellular amino acid levels and nucleotide derivatives to a single *ip* dose of lindane (10–60 mg/kg) and picrotoxin (5 mg/kg) in the hippocampus of halothane anaesthetized rat by microdialysis-coupled HPLC analysis. Brain activity was monitored by EEG. The effects of lindane and picrotoxin on EEG pattern of rats as well as on hippocampal amino acid and nucleotide status were studied in 0–50 min, 50–100 min and 100–150 min periods post-dosing. Significant decreases in Glu and Asp were found after picrotoxin treatment. After 50–100 min post-dosing, hippocampal hypoxanthine and inosine levels increased to both lindane (10 mg/kg) and picrotoxin whereas xanthine and uridine levels increased to picrotoxin, only. Lindane elicited a dose-dependent occurrence of negative spikes accompanied with rhythmic activity at 4–5 Hz. The picrotoxin-induced 4–5 Hz activity did not display negative sharp waves and was accompanied by 10 Hz oscillations.

KEY WORDS: Lindane; picrotoxin; amino acids; nucleotides; EEG; microdialysis.

INTRODUCTION

In vitro and in vivo data clearly supports that the antagonism of GABA-mediated inhibition is probably an important mechanism by which gamma-hexachlorocyclohexane (lindane) produces neuronal hyperexcitability and convulsions (1 and references cited there). Also, previous studies indicate that a global increase in transmitter release from presynaptic terminals probably

does not occur during lindane intoxication (1 and references cited there). In vitro data have supported the hypothesis, as lindane decreases the evoked transmitter release of [³H]-D-aspartate (as a label for excitatory amino acids) from cultured granule neurons (2). Also, no detectable increase (3) but a decrease (4) of extracellular glutamate content was associated with the picrotoxin-induced seizures in the hippocampus. In the present study, we compared in vivo changes of extracellular amino acid levels to lindane and picrotoxin in the hippocampus by microdialysis-coupled HPLC analysis. In addition, since an increase in hippocampal adenosine release and metabolism associated with bicuculline-, kainic acid- and pentylentetrazol-induced seizures has been evidenced (5) we attempted to measure changes in the extracellular concentrations of nucleotide derivatives to lindane and picrotoxin as well. EEG was also recorded to monitor brain activity.

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Electrophysiology in neurotoxicology / editor, Herbert E. Lowndes. Author. Lowndes, Herbert E. Published. Boca Raton, Fla.: CRC Press, c Physical. Arch Toxicol. Nov;48(4) Neurotoxicology of vincristine in the cat. Electrophysiological studies. Goldstein BD, Lowndes HE, Cho E. Cats were given .Developmental neurotoxicology, also known as behavioral teratology, is the study of adverse effects on the structure or .. Electrophysiology in Neurotoxicology. The chapter concludes with a description of more recent techniques, including combinations of electrophysiology and molecular biology that promise to provide .NeuroToxicology specializes in publishing the best peer-reviewed original research . Electrophysiology, Calcium and second messenger signalling, Organic. Neurotoxicology: Approaches and Methods provides a unique and comprehensive presentation of In VITRO Electrophysiological Studies in Neurotoxicology. The significance and the potential application of the above findings in the fields of in vitro electrophysiology and neurotoxicology are discussed. 2. Keywords. for neurotoxicology screening and translational drug discovery employing native and stem cell-derived neurons and complementary electrophysiology assay. Neurotoxicology is one of our five main research themes. animal behaviour and activity; electrophysiology; neurochemical and receptor. Regulatory testing guidelines for the assessment of neurotoxicity rely exclusively High-throughput platforms for conducting patch-clamp electrophysiology are. Novel Electrophysiology Platform for Neuronal and . Evaluation of multi-well microelectrode arrays for neurotoxicity screening using a. Electrophysiological Correlates of Sensorimotor System Neurotoxicology. Annual Review of Pharmacology and Toxicology. Vol. (Volume. Neurotoxicology provides a thorough understanding of neurotoxicology through its integration of multilateral ideas Cellular Electrophysiology, T. Narahashi. Toxicological tests neurotoxicological investigations I. Anatomical and biochemical studies. Toxicological Neurochemical and electrophysiological studies. Aluminium-induced electrophysiological, biochemical and cognitive Aluminium (Al) is the most abundant metal known for its neurotoxicity in humans. It gains. approach using pharmacokinetic, neuropathological, neurochemical, electrophysiological, and behavioral methods is needed to determine whether a chemical.

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