6 - Neurobiology

OC-019 - (23998) - IMPACT OF IMIPENEM ON HIPPOCAMPAL GABAERGIC NEURONS EXPRESSING PARVALBUMIN, CALRETININ, AND CALBINDIN

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Imipenem is a broad-spectrum antibiotic, increasingly used in clinical practice, known to interfere with GABAergic receptors and reduce the depolarization threshold. In this study, we focused on hippocampal GABAergic interneurons that express calcium-binding proteins, which play an essential role in maintaining intracellular calcium homeostasis and, consequently, in neuronal and neurotransmitter release. Previous studies have primarily addressed the epileptogenic potential of imipenem and, unfortunately, used high doses that do not reflect clinical conditions. Therefore, our aim was to study the effects of imipenem treatment on the expression of parvalbumin, calretinin and calbindin in the hippocampal hilus of Wistar rats.

The animals received daily intraperitoneal injections of imipenem (40 mg/kg, comparable to that used in clinical practice) or saline solution for 10 days. After treatment, the animals were euthanized, perfused, and processed for immunohistochemistry for parvalbumin, calretinin, and calbindin. Neuronal densities in the hippocampal hilus were calculated by drawing with an optical microscope equipped with a camera lucida at a final magnification of 160×.

Interestingly, our results demonstrated that treatment with imipenem, at clinically relevant doses, did not produce significant changes in the density of neurons immunoreactive for parvalbumin, calretinin, or calbindin in the hippocampal hilus

These findings support previous clinical studies indicating that the neurological adverse effects of imipenem are primarily dose-dependent and associated with its concentration in brain tissue. Lower doses of imipenem do not appear to affect neurons expressing calcium-binding proteins.

Palavras-chave : Calcium-binding proteins, Hippocampus, Imipenem