**Influence of lacosamide, a third-generation antiepileptic drug on neuroprotection and hippocampal cell proliferation in a mouse brain**

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Epilepsy, one of the most common diseases of the nervous system, belongs to a group of social illnesses. Lacosamide (LCM) is a novel third-generation antiepileptic drug (AED), which is recommended as add-on therapy in adult and adolescent patients with partial-onset seizures with or without secondary generalization. LCM with its selective enhancement of slow inactivation of voltage-gated sodium channels stabilizes neuronal membranes and thus, exerts its anticonvulsant properties. The aim of the study was to evaluate the impact of LCM on neuroprotection and neurogenesis in healthy mouse brain. All experiments were performed on adolescent male C57/BL mice. Animals were injected with LCM once a day (10 mg/kg) for 10 days. The control mice were injected with 0,9% NaCl solution. Fluoro-Jade B (FJB) and TUNEL staining were performed to evaluate neurodegeneration and apoptosis of neural cells. Additionally, mice were given a BrDU injection for the last 5 days of the LCM and NaCl treatment to quantify the total amount of proliferating cells. Additionally, behavioral studies were conducted. FJB and TUNEL staining showed just single nerve cells degeneration or apoptosis in both LCM and control group. No spatial learning and memory disturbances were observed in Morris water maze test. In turn, results obtained from BrDU staining showed that LCM significantly decreased the total number of newborn cells compared to the control group. Overall, results demonstrated that chronic administration of LCM does not cause nerve cells degeneration; however it decreases hippocampal cell proliferation in mice brain. Project sponsored by NCN GRANT 2015/19/B/NZ7/03694