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PROGESTERONE REVERSED THE TRIMETHYLTIN-INDUCED INJURY ON THE HISTO-ARCHITECTURAL INTEGRITY OF THE HIPPOCAMPUS OF ADULT MALE WISTAR RAT

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ABSTRACT

The generation of new neurons occur throughout life in specific parts of the central nervous system. In order to further understand the concept of neuroregeneration and the mechanisms involved in these parts, this study focused on creating a disease model of the hippocampus of adult male Wistar rats using trimethyltin, which was further treated with progesterone to aid possible regeneration. Twenty four adult male Wistar rats were divided into three groups; Control (0.2 mL of normal saline), trimethyltin (TMT, 8 mg/kg stat dose only) and trimethyltin and progesterone (TMT-PROG, 8mg/kg stat dose and subsequently 16 mg/kg of progesterone). All administrations were intra-peritoneal. The animals were perfused with 4% paraformaldehyde, brains were excised and taken for haematoxylin and EOSIN, Cresyl Violet stain, Ki-67 and neuron specific enolase (NSE) staining. The results showed defragmented nuclei, disintegrated Nissl bodies, reduced number of Ki-67 positive cells and reduced NSE positive cells count in the hippocampus of the TMT group; these neuronal insults were more in Cornus Ammonis (CA2) and CA3 compared to CA1 and CA4. The rats in TMT-PROG showed cell resuscitation; presence of intact nuclei and of Nissl bodies, and significant increased number of positive NSE and ki-67 proteins positive cells in the hippocampus compared to the rats in TMT. The resuscitation of these cells were better in CA1 and CA4 compared to CA2 and CA3. This study concludes that progesterone has the potential to restore the integrity of hippocampal cells after trimethyltin induced hippocampal injury in adult male Wistar rats.

Key words: *Hippocampus, Progesterone, Neuroregeneration, Trimethyltin, Ki-67*, *Neuron specific enolase*

INTRODUCTION

The adult central nervous system (CNS) has been shown to undergo cell division throughout life in some areas, for example, the olfactory bulb and the hippocampus (Seri et al. 2006). Damage to the CNS leads to neurodegeneration, which forms the basis of most brain disorders, such as Alzheimer's disease, Huntington's disease and Parkinson disease. The mechanism(s) that underline the process of neurodegeneration is not well-understood. At present, there seems to be limited treatment options for the management of brain damage that is related to neurodegenerative diseases. The medications that are currently used for patients with certain brain disorders and damage are either expensive or not readily available. Therefore, the treatment of patients with conditions that originate from neurodegeneration are still under intense investigations by researchers in the field of neuroscience (Rubinsztein 2006).
Trimethyltin (TMT) is a colourless to white, sand-like

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