**D-galactose and aluminium chloride induced rat model with cognitive Impairments**

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INTERNATIONAL CONFERENCE ON RECENT TRENDS IN HUMANITIES AND SCIENCE 2018, 'ICRTHS-2018'.
UNIVERSITI TUNKU ABDUL RAHMAN, BANDAR BARAT, 31900 KAMPAR, PERAK, MALAYSIA.
26TH OCTOBER 2018.
American J of Bio-pharm Biochem and Life Sci 2018 December, Vol. 6: OP33

**ABSTRACT**

Cognitive impairments and cholinergic dysfunctions have been well reported in old age disorders including Alzheimer's disease (AD). D-galactose (D-gal) has been reported as a senescence agent while aluminium act as a neurotoxic metal, but little is known about their combined effects at different doses. The aim of this study was to establish an animal model with cognitive impairments by comparing the effects of different doses of co-administrated D-gal and aluminium chloride (AlCl3). Male albino wistar rats were administered with D-gal 60 mg/kg.bwt intraperitoneally (I.P) injected and AlCl3 (100, 200, or 300 mg/kg.bwt.) orally administered once daily for 10 consecutive weeks. Performance of the rats were evaluated through behavioural assessments; Morris water maze (MWM) and open field tests (OFT); histopathological examination was performed on the hippocampus; moreover, biochemical measurements of acetylcholinesterase (AChE) and hyperphosphorylated tau protein (p-tau) were examined. Our results showed that rats treated with D-gal 60+AlCl3 200 mg/kg.bwt showed near ideal cognitive impairments. As the rats exhibited an obvious memory and learning deficits in MWM, marked neuronal loss in hippocampus as revealed by Nissl's stain, showed increase in AChE activities and high expression of p-tau within the tissues of the brain. When effectively administered, D-gal 60+AlCl3 200 mg/kg.bwt could serve as an ideal dose for inducing AD like cognitive impairments in albino wistar rats. This is crucial for understanding the pathogenesis of this neurodegenerative disorder and for drug discovery.