UNIVERSITI TEKNOLOGI MARA

NEURONAL TOXICITY OF ALUMINIUM CHLORIDE AND D-GALACTOSE: BIOCHEMICAL ALTERATION

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ABSTRACT

Alzheimer's disease is the most common neurodegenerative disease and causes progressive impairment of memory, declined cognitive functions, massive disruptions in socioeconomic and ultimately lead to death. Until now, there is no cure of Alzheimer's disease. Aluminium and D-galactose are known to cause neurotoxicity. However, the exact mechanism underlying the neurotoxicity caused by Aluminium is not clear. In the present study, both Aluminium chloride and D-Galactose was evaluated whether the dual toxicity can affect normal pathophysiology of brain by additive and/or synergistic action. This study also served as basis to develop a new animal model for Alzheimer's disease . The biochemical alterations that occurred was assessed by oxidative parameters like lipid peroxidation assay, nitrite assay, reduced glutathione test, superoxide dismutase test and acetylcholinesterase test. The result of the study conducted show that there was significant increase ($P < 0.05$) in lipid peroxidation, nitrite and acetylcholinesterase activity and decrease in the content of endogenous antioxidant enzyme that were reduced glutathione and superoxide dismutase. Therefore, the results suggested that there is a biochemical alteration that occurred inside the rat brain when Aluminium Chloride and D-Galactose were concomitantly administered.

CHAPTER 1

INTRODUCTION

1.1 Background of Study

As we aged, our body systems and organs start to deteriorate bit by bit. Aging can be defined as an age-dependent decline in fitness and decrease in efficiency of body component's functions (Bilkei-Gorzo, 2014). Aging of the brain is one of the most important matters that have gained attention from researchers from all over the world. The actual process of aging and the mechanism involved behind the process should be well understood simply because without a brain, we cannot survive. Our brain is important as it command and controls all the other functions in our body. Aging of the brain can be further divided into pathological aging and normal aging.

In normal healthy aging, a few changes that occurred in the brain are shrinkage of the brain especially in the prefrontal cortex, alteration in neurotransmission due to changes in neuron and neurotransmitter, presence of free radical, inflammation and others (National Institute of Aging : The Changing in Healthy Brain). Those changes will contribute to reduced cognitive ability as they take time to learn new things and even facing difficulties to recall back information. The normal aging is as important as pathological aging because they are inter-related to each other. It gives us some insight on how to differentiate them. Pathological aging involve neurodegenerative and cerebrovascular disorders and later lead to