

UNIVERSITI TEKNOLOGI MARA

**NEUROPROTECTIVE EFFECT OF STIGMASTEROL ON LIPOPOLYSACCHARIDE-
INDUCED NEUROINFLAMMATION IN MICE**

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ABSTRACT

Neurodegenerative disease is a heterogeneous group of disorder that occurs due to the loss of structure and function of neuron. Neurodegeneration occur due a few factors for example neuroinflammation, oxidative stress and the accumulation of beta-amyloid protein. These condition are incurable and the complication of neurodegenerative diseases can affect the quality's life of patient. Many study have been conducted to find the cure for these disease. Stigmasterol is a phytosterol, found in plant abundantly. Previous studies indicated that stigmasterol has many positive effects towards health. Therefore, this study is conducted to determine the potential effect of stigmasterol in reducing oxidative stress that cause neuroinflammation by measuring the activities of antioxidant enzyme i.e superoxide dismutase, glutathione peroxidase and catalase. Lipopolysaccharide (LPS) was administered to induce neuroinflammation in mice. Beforehand, mice were given stigmasterol (10, 20 or 40 mg/kg) daily for 7 days. LPS was administered on day 4 to day 7. On day 8, the mice were sacrificed via cervical dislocation and brain was excised and homogenized. The activity of antioxidant enzyme in supernatant was later measured by using ELISA kit. Our result indicated that stigmasterol (20mg/kg) was able to increase catalase activity ($p<0.05$) compared to untreated group but has no effect towards (Result indicated that stigmasterol show effect towards catalase ($p<0.05$) but has no effect towards superoxide dismutase and glutathione peroxidase. Stigmasterol 20mg/kg enhanced activity of catalase compared to untreated group. In conclusion, stigmasterol has potential in regulating antioxidant enzyme in the LPS-induced mice. Stigmasterol may be responsible in preventing oxidative stress which may lead to neurodegenerative disease. This may be due to the antioxidant and anti-inflammatory characteristics present in stigmasterol. However, it is vital to carry out further investigation to reveal the mechanism of action of this compound for future development.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Neurodegenerative disease is a heterogeneous group of disorders that are characterized by slow losses of function and structure of neurons (Kim et al., 2015). Neurons are the building blocks of the nervous system including brain and spinal cord which cannot be reproduced and replaced by the body once it has been damage (Khanam et al., 2016). The progressive loss of structure and function of neurons is referred as neurodegeneration that lead to neurodegenerative disorder. Neurodegenerative disorder can be manifested as movement disorder, cognitive impairment, and psychiatric disturbance (Przedborski et al., 2003).

The prominent examples of neurodegenerative disorders are Alzheimer's disease (AD), Huntington's disease (HD), Parkinson's disease (PD), and prion disease or transmissible spongiform encephalopathy such as Creutzfeldt-Jacob disease (CJD). These diseases occur worldwide with some prevalence rates and geographical variations in incidence. AD is the most common disease that accounts for 50% to 70% of all cases (Lee et al, 2012).