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EFFECT OF ASTAXANTHIN ON SHORT TERM MEMORY AND LEVELS OF REDUCED GLUTATHIONE AND MITOCHONDRIAL COMPLEX IV IN SCOPOLAMINE TREATED MICE

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ABSTRACT

Researchers have failed to find the cure for Alzheimer's disease (AD) since it was first diagnosed in 1910 until now. The drugs available in the market are only able to alleviate the symptoms experienced by AD's patient, not treating the disease. This is a main concern because AD is a serious brain disorder that often occurs in old age. In this research, the effect of astaxanthin (AST) on memory enhancement was studied. We also investigated reduced glutathione and mitochondrial complex IV levels on scopolamine-induced mice to see the effect of AST on memory enhancement. The effect of AST was studied by using Morris water maze test, biochemical assay (reduced glutathione) and mitochondrial enzyme estimation (mitochondrial complex IV). Based on this study, we found that AST does not lessen the symptoms of AD. It did not show increase in GSH nor COX IV levels. It may have antioxidant effect but this is not seen in this study using SCP-induced mice.

Keywords: Morris water maze test, reduced glutathione, mitochondrial complex IV

CHAPTER ONE

INTRODUCTION

1.1 Background

Alzheimer's disease (AD) is associated with memory loss and often occurs at late age. About 50, 000 people suffer from AD in Malaysia currently (Alzheimer's Disease Foudation (Malaysia), n.d.). AD was first discovered by Dr. Aloysius Alzheimer and it was named after him ("Alzheimer's & Brain Research Milestones | Research Center | Alzheimer's Association," n.d.). His research on AD is still used by medical practitioner nowadays. He described the brain's condition of AD patients as having abnormal deposits of plaques and tangles within and around the nerve cells ("Alzheimer's Disease - A Brief History and Description," n.d.). AD patients show symptoms related to cognitive impairment such as chronic memory loss, confusion and disorientation (Alzheimer's Association, n.d.). These symptoms are the effect of abnormal production of tangles and plaques which deposit in and between the nerve cells. Astaxanthin (AST) is a carotenoid that has antioxidant with immunomodulatory, anti-inflammatory and anticancer properties. It acts as an antioxidant by quenching singlet oxygen and free radicals (Naguib, 2000). The free radicals and reactive oxygen species (ROS) are the one that cause oxidative damage in the brain that leads to AD.