UNIVERSITI TEKNOLOGI MARA

CAFFEINE EFFECTS ON WORKING MEMORY USING RADIAL ARM MAZE IN BALB/C MICE

NUR IZZURA BINTI JAAFAR

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Abstract

Background: Learning and memory are part of cognitive function that are essential in human. Caffeine acts as brain stimulant. Studies have shown that the consumption of moderate amount of caffeine increases the ability to attention, alertness, cognitive performance and motor performance via blockade of adenosine receptors. In this report, we demonstrate that effect of caffeine on working memory using radial arm maze in BALB/c mice. *Results and Discussion:* The results showed that caffeine does not have effects on the number of correct entries into the baited arms which represents the working memory performance, indicating that mice did not learned the task. Besides that, the caffeine-treated mice showed high percentage of working memory errors than control animals. The working memory errors were assessed as the number of re-entries into arms already entered during the same trial. Although the value is not significant, the caffeine-treated mice performing greater average speed than control. It shows the caffeine-treated mice have higher locomotor activity. *Conclusion:* In summary, this present study documents the working memory-enhancing properties of caffeine administration in BALB/c mice. To further explain the cognitive effects of caffeine on working memory, the study should be repeated on different strain of mice with different doses of caffeine.

Acknowledgement

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CHAPTER 1

INTRODUCTION

1.1. BACKGROUND OF STUDY

Brain is the most complex organ which directly involves in cognition consisting learning, attention, memory, language and visual-spatial ability for the consciousness of situation, needs and goals. Attention and memory are interrelated to each other. Studies have shown that, in some situations, increase in attention can facilitate memory performance (Nehlig, 2010). The adenosine receptors (ARs) are ubiquitously distributed in the brain and play an important role in attention, learning and memory (Dunwiddie & Masino, 2001). Endogenous adenosine can promote, the release of acetylcholine (Ach), dopamine (DA), gamma-aminobutyric acid (GABA) and glutamate which are have been implicated in learning and memory (Kirk & Richardson, 1995). Distributions of adenosine receptors into specific anatomical structures demonstrate the importance of adenosine receptors for particular aspects of memory task. Caffeine, a methylxanthine and act as adenosine receptor antagonist in the brain. It is widely consumed substance in the world (Hashimoto et al., 2004) which primarily can be found in tea and coffee. There are evidences illustrate that caffeine can enhance cognitive function. Studies by (Fisone, Borgkvist, & Usiello, 2004) also show that caffeine can increase the locomotor performance. So, it plays an important role in treatment of several cognitive