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THE EFFECT OF FOLIC ACID ON DIFFERENT GENDERS OF *SPRAGUE-DAWLEY* RATS

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ABSTRACT

Homocysteine involves in DNA methylation. High level of homocysteine level has a possible risk to get cardiovascular disease. Folic acid helps to reduce the homocysteine level. Folic acid also helps to reduce lipid profile level. Male and female genders have different level of lipid profiles. Therefore, the effect of folic acid supplement on body weight, food and water intake, lipid profiles, and haematological profiles were investigated for both genders. Control group (group 1) for both genders were given with normal saline. Four groups of both genders were given different doses of folic acid orally: 2 mg/kg (group 2), 5 mg/kg (group 3), 10 mg/kg (group 4), and 20 mg/kg (group 5), respectively for two weeks. Whole blood sample was collected for each rat for haematological analysis meanwhile serum collected from blood sample was used for lipid profile analysis. There was a significance difference in food and water intake ($p<0.05$) for both genders, cholesterol level in male group 2, 3 and 5 ($p=0.03$), low-density lipoprotein (LDL) in female group 5 ($p=0.027$), triglyceride level ($p<0.05$) for all male groups, lymphocyte count in male from group 5 ($p=0.049$), red blood cell count in male from group 2 ($p=0.045$), mean corpuscular volume in male from group 2 ($p=0.021$) and female group 2 ($p=0.018$) and group 3 ($p=0.028$), mean corpuscular haemoglobin in female group 3 ($p=0.02$), and lastly platelet count in male group 2 ($p=0.012$) and group 3 ($p=0.039$). There were no differences shown in body weight for both genders, cholesterol level in female groups, high-density lipoprotein and low-density lipoprotein in both groups, and triglyceride value in female groups. In haematological analysis, there was no significance difference in both genders which are white blood cell, neutrophil, lymphocyte (except group 5 in male group), monocyte, eosinophil, basophil, red blood cell (except group 2 male), haemoglobin, haematocrit, mean corpuscular haemoglobin concentration, red cell distribution width, and mean platelet volume. As a conclusion, folic acid gives the effect on food and water intake for both genders, and cholesterol and triglyceride level in male groups.

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CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Introduction/ Background study

Folic acid is one of the supplement that has been taken by women (Cho *et al.*, 2013) especially during their pregnancy (Farah *et al.*, 2013). Folate supplement helps to reduce the occurrence of neural tube defect to babies (Bailey, 2010; Wilson *et al.*, 2007). Folic acid is one of the cofactor in the one-carbon metabolism in DNA methylation (Bailey, 2010; Kim, 2005). Mechanism of DNA methylation showed women who consume high folate supplement during pregnancy can alter the food intake and reduce the obesity in their offspring (Cho *et al.*, 2013).

Zain *et al.* (2007) conducted a study to determine the prevalence of obesity in Malaysia. The results showed that obesity among Malaysian with age around 15 years old and above was 11.7 %. Obesity rate among women is higher than men with 13.8 % and 9.6 %, respectively. Obesity is one of the factors that can develop other diseases such as cardiovascular disease, cancer, chronic respiratory disease and also diabetes mellitus. Obesity can be determined by calculating Body mass index (BMI) (Cho *et al.*, 2002). Person with body mass index equal or over than 30 kg/m^2 is categorized as obese. Obesity problem can be managed and treated by two ways which are through