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INVESTIGATION OF THE RELATIONSHIP BETWEEN 5-HT2C RECEPTOR GENE POLYMORPHISM WITH EATING HABIT

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ABSTRACT

5-HT_{2C} receptor plays a major role in feeding and weight gain. The polymorphism of the receptor may become a possible reason behind different level of appetite and amount of food intake in different people. Aim of this research is to explore the frequency of 5-HT_{2C} receptor gene variant in university student, to investigate the relationship between polymorphism of 5-HT_{2C} receptor gene and eating habit and Body Mass Index, and to develop a PCR method that is able to detect the polymorphism of 5-HT_{2C} receptor gene. 14 subjects were screened for polymorphisms at the promoter region of 5-HT_{2C} (rs3813928 G/A, rs3813929 C/T, rs1414334 C/G).DNA were amplified using Polymerase Chain Reaction method. The association between BMI and 5-$HT2_CR$ genotypes was investigated with univariate analysis of variance (ANOVA) and Independent T-Test. The association between appetite and 5-$HT2_C$ receptor genotypes was investigated with Mann-Whitney U Test and Kruskal-Wallis test. As a result, it shows that genotype of rs3813939 indeed has a significant difference in the common allele and heterozygotes allele mean BMI where subject who are heterozygotes has bigger BMI compared to the common allele ($p=0.012$). However, the result shows that there are no significant different between level of appetite across different genotype of the subjects. Stepwise Regression analyses were done to find genotype that has the most influences on its Mean BMI and appetite. From the analysis, genotype rs3183929 has the most influences on its BMI with $p=0.012$ ($p<0.05$). However, regression analysis shows that all genotype did not significantly influence its mean appetite level. Furthermore it shows that the frequencies of allele in female university student almost follow the same frequencies of population density studied in East Asian population. As conclusion, the polymorphism of rs3183929C>T at promoter region of 5-HT_{2C} receptor did have an influences on the BMI of the carrier, where heterozygotes are at greater risk of obesity compared to homozygote carrier. However the study did not found any association between genotype differences and the level of appetite.

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CHAPTER 1

1.0 INTRODUCTION

1.1 Background of study

Serotonin, or scientifically known as 5-Hydroxytryptamine (5-HT) has it principal role in neural transmission (Sander-Bush *et a*l., 2007). It can be found through out the body from intestine to central nervous system, to cardiovascular system and blood (Pauwel, 2003). Due to its wide distribution, 5-HT influences many spheres of mammalian physiology such as aggression, sexual behaviour, mood, cognition, learning, memory and appetite regulation. (Becamel, 2008 and Sander-Bush *et al.*, 2007).

According to Sander-Bush *et al.* (2007), this diverse action of 5-HT are mediated by its multiple receptors. The receptors are categorized into seven families with fourteen subtypes. And not surprisingly, 5-HT has been implicated in an amazing variety of human diseases. And the one that of interest in this study is the relationship between 5-HT receptor with eating habit and appetite.

Generally, 5-HT_{2C} receptor play a major role in feeding and weight gain (Ryu *et al.*, 2007) and its also implicated with wide range of behaviour, anxiety, and some physiological processes such as hypophagia (undereating), motor function and