

## The Pharmacogenetics of Type 1 Cannabinoid Receptor (CB1) Gene Associated with Adverse Drug Reactions in Thai Patients

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**Abstract :** Introduction: The variation of genetics affects how our body responds to pharmaceuticals elucidates the correlation between long-term use of medical cannabis and adverse drug reactions (ADRs). Medical cannabis is regarded as the treatment for chronic pain, cancer pain, acute pain, psychological disorders, multiple sclerosis and migraine management. However, previous studies have shown that delta-9-Tetrahydrocannabinol (THC), an ingredient found in cannabis, was the cause of ADRs in CB1 receptors found in humans. Previous research suggests that distributions of the cannabinoid type 1 (CB1) receptor gene and pharmacogenetic markers, which vary amongst different populations, might affect incidences of ADRs. Although there is an evident need to investigate the level of the CB1 receptor gene (rs806365), studies on the distribution of CB1-pharmacogenetics markers in Thai patients are limited. Objective: Therefore, the aim of this study is to investigate the distribution of the rs806365 polymorphism in Thai patients who have been treated with medical cannabis. Materials and Methods: We enrolled 31 Thai patients with THC-induced ADRs and 34 THC-tolerant controls to take part in this study. All patients with THC-induced ADRs were accessed through a review of medical records by physicians. EDTA blood of 3ml was collected to obtain the CNR1 gene (rs806365) and genotyping of this gene was conducted using the real-time PCR ViiA7 (ABI, Foster City, CA, USA) following the manufacturer's instruction. Results: The sample consisted of 65 patients (40/61.54%) were females and (25/38.46%) were males, with an age range of 19-87 years, who have been treated with medical cannabis. In this study, the most common THC-induced ADRs were dry mouth and/or dry throat, tachycardia, nausea, and arrhythmia. Across the whole sample, we found that 52.31% of Thai patients carried a heterozygous variant (rs806365, CT allele). Moreover, the number of rs806365 (CC, homozygous variant) carriers totaled seventeen people (26.15%) amongst the subjects of Thai patients treated with medical cannabis. Furthermore, 17 out of 22 patients (77.27%) who experienced severe ADRs: Tachycardia and/or arrhythmia, carried an abnormal rs806365 gene (CT and CC alleles). Conclusions: The results propose that the rs806365 gene is widely distributed amongst the Thai population and there is a link between this gene and vulnerability to developing THC-induced ADRs after being treated with medical cannabis. Therefore, it is necessary to screen for the rs806365 gene before using medical cannabis to treat a patient.

**Keywords :** rs806365, THC-induced adverse drug reactions, CB1 receptor, Thai population

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