Screening for Genetic Polymorphism in GRIN2B Gene in Patients Diagnosed with Bipolar Disorder

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Bipolar disorder is a psychiatric disorder with phases of mania and depression. Past studies have implicated a relationship between bipolar disorder and NMDA receptor which is a glutamate receptor involved in key cognitive functions of the brain – synaptic plasticity as well as learning and memory functions. The human GRIN2B gene, made up of 13 exons, codes for one of the four heterotetramers in the NMDA receptor. There have been multiple studies on exon 2, exon 13 and UTR of the gene, but little research has been carried out on the remaining exons. As such, this project serves as a pilot study on exons 7 to 12 of the GRIN2B gene on Singapore Chinese bipolar disorder patients. Our objective was to locate and determine the frequency of any Single Nucleotide Polymorphisms (SNP) present. 30 bipolar patients have been screened against 30 normal patients and their isolated DNA was amplified via PCR before purification. Gel electrophoresis was performed to confirm the presence of the PCR amplicon before it was sequenced and screened for genetic variations. Two SNPs were identified, namely 1525G/A and rs1805522 (1806C/T), on exons 7 and 9 respectively. The study revealed 1525G/A as a novel SNP not present in the SNP database previously. Both SNPs were found to be strongly associated with bipolar disorder (P-value <0.0001 and 0.0208 respectively), signifying GRIN2B having a role in the etiology of bipolar disorder. This study sets precedence for future research on the link between GRIN2B and bipolar disorder which is especially relevant to the Singapore population.

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