Ph.D. thesis abstract

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Abstract

The present study aimed to investigate the effect of direct pesticide exposure in combination with selected DNA polymorphisms of the pesticide detoxification and metabolism genes viz., MDR1, CYP2D6 and GST in the rural population of Punjab and to validate association, if any, of these polymorphisms with Parkinson's disease (PD). It also aimed to provide baseline data on these gene polymorphisms in the people of Punjab.

For the present work, a total of 300 adult subjects, including 164 sprayers and 136 non-sprayers, inhabiting rural areas of various districts of Punjab were enrolled. About 5 ml intravenous blood sample was collected from the subjects and DNA was extracted by using the salting out method. Genotyping for the four SNPs viz., rs1045642 (MDR1), rs3892097 (CYP2D6*4), rs16947 (CYP2D6*2) and rs1695 (GSTP1) was performed using PCR-RFLP and that of the two gene polymorphisms viz., GSTM1 and GSTT1 was performed using multiplex PCR.

Barring rs3892097 (CYP2D6*4), all remaining three SNPs were found to be in the Hardy-Weinberg equilibrium. The Chi square test revealed no statistically significant difference in the distribution of genotypes in the sprayers and non-sprayers. The linkage disequilibrium (LD) found between rs16947 (CYP2D6*2) and rs3892097 (CYP2D6*4) SNPs may be attributed to their close proximity on CYP2D6 gene.

There is scientific evidence for the possibility of role of the pesticide exposure in risk of developing PD by interacting with the pesticide detoxification and metabolising genes. However, in the present study no sprayer subject was found to have PD and this observation may be attributed to a comparatively low prevalence of the disease in India. As for the second aim, the present study has provided baseline data on four SNPs viz., rs1045642 (MDR1), rs3892097 (CYP2D6*4), rs16947 (CYP2D6*2) and rs1695 (GSTP1) and two gene polymorphisms viz., GSTM1 and GSTT1 in people of Punjab and has filled the void on the genetic map of India.

Key words: Pesticide exposure, Parkinson's disease, DNA polymorphism, Rural population, Punjab.