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The induction of Micronucleus and Aneuploidy in human lymphocytes by Hydroquinone and its association with Genetic Polymorphisms of CYP1A1, GSTM1, GSTT1, NQO1 gene

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In order to investigate whether the induction of micronucleus and aneuploidy in human lymphocytes by Hydroquinone (HQ) is associated with genetic polymorphisms of CYP1A1, GSTM1, GSTT1, NQO1 gene, the cytokinesis-block micronucleus (CBMN) assay in combination with fluorescence in situ hybridization (FISH) technique using specific centromeric probes for chromosome 7 and 8 and PCR-RFLP based genotyping for 30 healthy people were performed. The frequency of MN increased from 3.50 per 1,000 binucleated (BN) cells to 8.27 per 1,000 BN cells after 50mM HQ treatment ($p<0.05$). There was significant difference in the frequencies of aneuploid BN cells of chromosome 7 and 8 in control and HQ treated lymphocytes. Total aneuploidy of chromosome 8 and the frequency of MN containing centromere positive signals {(2+1)+1} for chromosome 8 induced by the HQ was more frequent than chromosome 7, suggesting that chromosome 8 is more sensitive to aneuploidy induction by HQ. Association of genetic polymorphisms with the frequency of MN by HQ treatment was not observed, but CYP1A1 homozygous variant type was associated with the MN induction. No association of aneuploidy of chromosome 7 in HQ treated lymphocytes with genetic polymorphisms was found. The induction of aneuploidy 8 by HQ was associated with GSTT1 null genotype and CYP1A1 homozygous variant type. The frequencies of aneuploidy 7 was associated with the combined genotypes of GSTM1 and CYP1A1.

Keyword : Cytokinesis-block micronucleus, Aneuploidy, Genetic polymorphism, Hydroquinone