NQO1 C 609 T polymorphisms analyzed in a population from Kolkata, West Bengal

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Sir,

The recent paper of Parihar and Chauhan[1] in your journal showed that the frequencies of different polymorphs of NQO1 genes were statistically distinct in the population residing in Vindhyan range, Madhya Pradesh, India, compared with the Caucasian and other Asian and European populations.

NADP (H) Quinone Oxidoreductase 1 participates in detoxification of numerous compounds mainly by catalyzing the 2 electron reduction of the quinones to hydroquinones. Its polymorphic variant, C 609 T, is gaining much importance as it has a direct effect on the catalytic potential of the enzyme. The NQO1 variant form C 609 T, which leads to an amino acid change from Proline to Serine at codon position 187, exposes the enzyme to proteosomal degradation so that the available protein is less, and this leads to accumulation of Reactive Oxygen Species (ROS). The heterozygous carrier of this variant form has a 60% less catalytic efficiency, whereas a negligible amount of enzyme is found in homozygous mutant variant individuals, making the individuals more susceptible to carcinogenesis. This variant form of NQO1 is shown to be associated with an increased risk of acute myeloblastic leukemia[2] and many tobacco-associated cancers, namely lung cancer, colorectal cancer,[3] esophageal cancer[4] and, mostly, head and squamous cell carcinomas,[5] in many parts of the world.

The use of tobacco and its associated products, either smoking or smokeless forms, or chewing arecanut as "pan masala" or "gutkha" is highly prevalent in south-east Asia, especially in the Indian subcontinent. Therefore, it is important to study the genetic predisposition of NQO1 polymorphism across various regions of the Indian subcontinent. Again, ethnicity is one of the main factors to be considered in genetic predisposition. However, very few studies exist depicting the prevalence of this NQO1 C 609 T genotype in the Indian subcontinent.[1,6]

In this context, our pilot study examined the prevalence of NQO1 C 609 T polymorphism among 152 individuals from Kolkata, West Bengal [Table 1] in a different region of India compared with earlier studies. In our study, 78 (51.0%) individuals were found to carry minor T as heterozygous state whereas 13 (8.5%) individuals were homozygous mutants for this polymorphism. When stratified according to sex, both heterozygous and homozygous was found to be equally distributed [Table 1].

Interestingly, comparison of our results with the genotype frequencies observed in Caucasian, Chinese, Korean, Swedish, Iranian and Indian populations revealed that the population of this region of eastern India is distinct with respect to all other population except the Chinese, to which it bears close resemblance [Table 2].

Moreover, the frequencies of TT and CT genotypes are higher in this population compared with those from other parts of India. Further studies need to be focused

Table 1: Distribution of NQO1 genotypes among the study groups of Kolkata, West Bengal population

Category	Number	Wild type (Pro/Pro) *n* (%)	Heterozygous (Pro/Ser) *n* (%)	Homozygous (Ser/Ser) *n* (%)
Total population	152	62 (40.0)	78 (51)	13 (8.5)
Male	74	30 (40.0)	38 (51)	6 (8.1)
Female	78	32 (41.0)	39 (50.0)	7 (8.9)

Table 2: Distribution of NQO1 genotypes among the study groups of different Asian and European populations

Population	Pro/Pro (%)	Pro/Ser (%)	Ser/Ser (%)	References
Caucasian	79	16	5	Zhang *et al.*[4]
Chinese	34	49.7	16.3	Zhang *et al.*[4]
Korean	94.5	5.2	0.3	Cho *et al.*[5]
Swedish	69.4	28.9	1.7	Alexandrie *et al.*[7]
Iran: Fars	59.5	31	9.5	Biramijamal *et al.*[8]
Iran: Mazzandarani	64	24	12	Biramijamal *et al.*[8]
Iran: Turk	69	28	2.4	Biramijamal *et al.*[8]
Indian: Vindhya range	68.6	24	7.4	Parihar and Chauhan[1]
Indian: Kashmir	72.5	24.4	3.1	Sameer *et al.*[6]
Indian: Kolkata	40.5	51	8.5	Present study

on the correlation of NQO1 genotypes with smoking/chewing habits, and the association with oral cancer and precancer would predict the risk of carcinogenesis in this population.

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