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Microsatellite Diversity in HbS Carrier and Normal Individuals of Tribal Populations of Malaria Infested Regions

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KEYWORDS Sickle cell anemia; microsatellite markers; heterozygosity; Hardy-Weinberg equilibrium; genetic diversity.

ABSTRACT Sickle cell gene is a variant form of beta globin developed in human genome as a protective mechanism to malaria. The frequency of HbS gene varies considerably with ethnic group and geographical location coinciding with distribution of malaria. Occurrence of sickle cell mutation is very high among different endogamous groups of Chattisgarh, Maharastra, and Jharkhand state with equally high incidence of malaria infection. Hardy-Weinberg test was performed to assess genetic equilibrium among HbS carriers and normal individual of Agharia, Pawra and Oraon communities of the three states. Genetic diversity in two groups across fifteen microsatellite markers was studied using three important parameters viz., number of alleles, allele size variance and heterozygosity. Significant departure from Hardy Weinberg equilibrium was observed only at TH01 (11p15.5) among the carriers, which could be due to association of the locus with beta globin gene (11p15.5). Allele diversity is observed to be very high in normal individuals at each locus (with additional rare alleles at FGA, Penta D and D21S11 loci) in comparison to sickle cell carriers. The difference in the heterozygosity level (~5%) between two groups was observed to be highest at two significant loci THOI and CSF1PO (5q33.3-34), thereby indicating maximum pressure of the malarial parasite at these loci, leading to increase in the number of repeat units, among the normal individuals. Perhaps high genetic diversity in the normal group is to add resistant allele against malaria. Our study clearly demonstrates that microsatellites, besides being hot spots for recombination has another important role in enabling the individual to adapt to the stressful environment of parasite.

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