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Allele frequency of the Duffy blood group system in individuals of a population in the Brazilian Amazon and its relationship with the infection by *Plasmodium vivax**

Frequência alélica do Sistema de Grupo Sanguíneo Duffy em indivíduos de uma população da Amazônia brasileira e sua relação com a infecção por Plasmodium vivax

Frecuencia alélica del Sistema del Grupo Sanguíneo Duffy en individuos de una población de la Amazonía brasileña y su relación con la infección por *Plasmodium vivax*

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Introduction: In Brazil, malaria is the most relevant epidemic and occurs mainly in the Amazon region. This region favors the existence of breeding areas for vector mosquitoes because of its climate, hydrography, rainfall and disordered human occupation. The Duffy blood group (*Duffy antigen receptor for chemokines*; DARC), is an erythrocyte protein with antigenic determinants that mediates the invasion of erythrocytes by *Plasmodium vivax* merozoites. **Objective:** This study aimed to determine the frequency of the Duffy alleles in individuals that inhabit areas that are endemic for malaria within the Amazon. This data was then compared to susceptibility to P. vivax infection. **Materials and Methods**: Blood samples were collected from 244 individuals living in the Municipality of Presidente Figueiredo, Amazonas State, Brazil. Total blood samples were collected for the genotyping and phenotyping of Duffy alleles. A second set of blood samples was collected with digital puncture to diagnose malaria using thick blood smear testing. Phenotypes were assayed by hemagglutination tests (DiaMed), whereas genotypes were determined by polymerase chain reaction (PCR). Comparisons between genotypic and phenotypic frequencies were based on Pearson's chi-square test (significance level = 0.05). Statistical analysis was performed with Epi InfoTM (version 3.43; Centers for Disease Control and Prevention, Atlanta, USA). **Results**: Among the individuals tested, 164 were negative for *P. vivax* malaria, whereas 80 were positive. The findings show a high frequency of the *FYA/FYB* (47.5%) genotype, which was followed by *FYB/FY* (15.6%); *FYAFYA* (14.3%); *FYB/FYB* (11.5%); *FYA/FY* (8.6%) and *FY/FY* (2.5%). The frequency rates of the *FYA, FYB* and *FY* alleles were 55%, 38.8% and 6.3% for the infected individuals and were 36.3%, 45.1% and 18.6% in malaria-negative individuals, respectively. The null genotype was not detected in infected subjects; however, it was found in 3.7% of the individuals that tested negative. **Conclusion**: The frequency of the *FYA* allele was significantly higher in infected individuals ($p = 0.00643$). FYB was the most prevalent allele among malaria-negative patients, although its frequency rate was not significantly higher ($p = 0.34632$). The *FY* allele was the most prevalent in the negative group. Data analysis demonstrated that *FY* homozygosity was not observed in patients infected with malaria, which confirms the hypothesis that the *FY* allele has a protective effect. In heterozygotes, the presence of *FY* allele significantly decreased the susceptibility linked to the *FYA* allele. When associated with the *FYB* allele, the *FY* allele provided statistically significant protection. These findings suggest that these natural mutations might be advantageous and lead to partial defense mechanisms against *P. vivax* in endemic areas.

Keywords: Malaria, Vivax; Duffy Blood-Group System; *Plasmodium vivax*; Gene Frequency; Receptors, Chemokine.

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