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NATURAL RESISTANCE AND PREDISPOSITION FACTORS, AND THEIR IMPORTANCE FOR MALARIA CONTROL PROGRAMME IN BRAZIL

DOMINGOS ALVES MEIRA, PAULO ROBERTO CURI
& BENEDITO BARRAVIERA

For years, we have been developing studies in Humaita County, Amazonas State, Brazil. We reported a different behaviour between people from the banks of Madeira River, and those living along side the new roads, when studying the spleen index (Meira et al., 1980, 1981), and the incidence of natural resistance factors against malaria, such as AS hemoglobinopathy (Colauto et al., 1981), G6PD (Barraviera et al., 1985) deficiency and Duffy blood group negativity (Colauto et al., 1981). In this way, the spleen index was higher, while the natural resistance factors were less frequent, in people who live along side the new roads. On the contrary, the spleen index and the AS hemoglobinopathy, G6PD deficiency and Duffy blood group showed an opposite behaviour in those who live along side the banks of Madeira River.

All these data allow to suggest that there are close relations between the presence of natural resistance factors, and low intensity of malaria. On the other hand, malaria was hyperendemic and such factors were not observed in the areas recently occupied, mainly alongside the roads, were the migrants are numerous.

Attempts should be made in order to establish the racial composition of the inhabitants of Amazon Region, where malaria is endemic, considering that there may be natural factors of predisposition to the disease, just as the well known resistance factors.

Genetically homogeneous native Indian tribes can still be found in scattered settlements throughout the Amazon Region, and it is likely that their ancestors contributed greatly to the genetic make up of the current indigenous population. In this way, the frequence of the Duffy negative phenotype that we found in Tenhairim Indians, who live in Humaita region, was 7.1%. Sulzer et al., in 1978, reported a locus of hyperendemic *Plasmodium vivax* and *Plasmodium malariae* in a primitive tribe in the Peruvian Amazon jungle. They interpreted these data to suggest that *Plasmodium vivax* and *Plasmodium malariae* have existed in the New World since pre Columbian times. The existence of a negative phenotype for Duffy system among the Tenhairim Indians also suggests that a natural selection for resistant individuals has ocurred in areas where malaria is endemic in Brazil.

We have already investigated the casual existence of natural factors of predisposition to malaria, with the cooperation of Professor Kimyoshi Tsuji from Tokai University (Meira et al., 1985), by HLA-A,B,C and DR antigens typing, among a sample of infected inhabitants of Humaita County.

These results showed that there was a high frequence of blank alleles among the studied groups which suggests both the existence of homozygous alleles, or an unindentified phenotype within this population. In the study it was also observed a higher phenotipic frequency of $A_{9(24)}$ antigen (44.7%), and DR antigen (80.0%) in infected natives, which were not found in non-infected natives or in infected migrants. Although the population sample was small, this survey adds further evidence for an association between the genealogical origin of patients, HLA antigens, and a predisposition to malaria.

Finally, as a consequence of all that was discussed above, the natural resistance and predisposition to malaria should be considered as important factors among those involved in the control programmes. Therefore, it is essential that the principal methods used in malaria control programme are reviewed by Brazilian health authorities. This revision should include the diagnostic methods: introducing the immunological practices; therapeutic schedules: considering new drugs for treatment of resistant falciparum malaria, and protection measures to the susceptible and those which are more exposed to the disease transmission, such as other insecticides than DDT.

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Faculdade de Medicina, UNESP. Caixa Postal 522, 18600 Botucatu, São Paulo, SP, Brasil.

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