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

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For years, we have been developing studies in Humaitá County, Amazonas State, 
Brazil. We reported a different behaviour between people from the banks of Madeira River, 
and those living along 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 hyper- 
endemic 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 frequency of the 
Duffy negative phenotype that we found in Tenhaim Indians, who live in Humaitá region, 
was 7.1%. Sulzer et al., in 1978, reported a locus of hyperendemic Plasmodium vivax and Plas-
modium 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 
Tenhaim Indains also suggests that a natural selection for resistant individuals has occurred 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 
Humaitá County.

These results showed that there was a high frequency of blank alleles among the studied 
groups which suggests both the existence of homozgyous alleles, or an unidentified pheno-
type within this population. In the study it was also observed a higher phenotypic frequency of 
A_{24}(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: con-
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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REFERENCES


