Correspondence

To the Editor

Sensitivity of Duffy negative erythrocytes in *Aotus* monkeys to *Plasmodium vivax*

SIR—Erythrocytes from 34 individual monkeys, *Aotus trivirgatus griseimembra* (ATRGR), from Panama have been tested for Duffy Blood Group antigens using Dade commercial antisera: anti-Fy^a (Lot No. FA-45-BS) and anti-Fy^b (Lot No. FB-33-AK), and Coombs' anti-human globulin.

Blood grouping was carried out within 24 hours of collection, following the general instructions of the Technical Methods and Procedures of the American Association of Blood Banks (1974 edition), and the technical brochure of the Dade Division of the American Hospital Supply Corporation (Miami, Florida). All tests performed with erythrocytes of the ATRGR were macroscopically and microscopically negative. The control human erythrocytes were positive.

Two ATRGR monkeys of this group, which were previously splenectomized, received an intraperitoneal inoculum of *Aotus* blood, chilled for 24 hours, containing $1{\cdot}6 \times 10^6$ *Plasmodium vivax* parasites of the El Salvador II strain. This strain was adapted to *Aotus* monkeys in 1973 by Collins who generously provided the parasitized *Aotus* blood for this experiment. Both recipient monkeys showed patent parasitaemia eight and nine days after inoculation and Duffy typing was performed when they showed 18,460 and 66,990 parasites of *P. vivax* per microlitre of blood, respectively.

Also, two normal, spleen-intact *Aotus* monkeys were blood typed and shown to be Duffy negative. They were challenged intraperitoneally with a *P. vivax* inoculum containing $1{\cdot}8 \times 10^5$ parasites per microlitre of blood from one of the previous monkeys. Within 24 hours the monkeys exhibited a patent parasitaemia; this persisted for at least eight weeks in one monkey, with a peak parasitaemia of 1,980 parasites per microlitre of blood on day 24. The other monkey died on the third day from causes other than malaria, with a count of 20 parasites/μl.

Accumulated data regarding the nature of cell receptor sites for merozoites of *P. knowlesi* suggested the hypothesis that *P. vivax* could have a possible association between Duffy determinants in red cells and resistance to infection. It has been assumed that the Duffy negative phenotype could be the basis for human resistance to *P. vivax* blood infection as well as the resistance shown by *Cebus* monkeys to *P. vivax* and *P. knowlesi* blood infections.

WELCH *et al.* (1977) found a correlation between the absence of *P. vivax* infection and of Fy^a Fy^b antigens in erythrocyte samples from human populations in Gambia, where *P. falciparum* is prevalent. However, the high susceptibility of the *Aotus* monkey to *P. vivax* infections suggests major differences in man and *Aotus*, with reference to the Duffy blood group and invasion by *P. vivax* merozoites.

The comparison of differences in cell membrane components with frequency of invasion or affinity of binding of merozoite receptors should provide an insight into this problem, and into merozoite adhesion in general. Studies in human populations from different geographical areas, where *P. falciparum* is not prevalent, could lead to the better understanding of this phenomenon.

The conclusion to be drawn from this observation is that in the ATRGR monkey, invasion of erythrocytes by merozoites of *P. vivax* appears to occur at sites other than those of the Duffy blood groups antigens Fy^a and Fy^b.

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We are, etc.,
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