The deformability of red blood cells parasitized by *Plasmodium falciparum* and *P-vivax*

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Abstract:

Red blood cells (RBCs) must deform considerably during their multiple passages through the microvasculature and the sinusoids of the spleen. RBCs infected with *Plasmodium falciparum* (Pf-IRBCs) become increasingly rigid as they mature but avoid splenic clearance by sequestering in venules and capillaries. In contrast, RBCs infected with *P. vivax* (Pv-IRBCs) do not sequester. We compared the effects of *P. vivax* and *P. falciparum* infection on RBC deformability in a laminar shear flow system. Pf-IRBCs became more rigid as the parasite matured, but equivalent maturation of Pv-IRBCs resulted in a doubling of flexibility. Coincidentally, the IRBC surface area increased from 56.7 +/- 1.3 mum(2) to 74.7 +/- 0.6 mum(2) to 90.9 +/- 1.1 mum(2) in ring-, trophozoite-, and schizont-stage Pv-IRBCs, respectively, whereas Pf-IRBCs did not increase in size. *P. vivax* increases the deformability of IRBCs and thereby avoids splenic entrapment.

JOURNAL OF INFECTIOUS DISEASES. 2004; 189(2) : 190-194