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A Low Interleukin-10 Tumor Necrosis Factor-a Ratio Is Associated with Malaria Anemia in Children Residing in a Holoendemic Malaria Region in Western Kenya

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Abstract

The balance between Th1 cytokines (tumor necrosis factor [TNF]-a, interferon [IFN]-g) and Th2 cytokines (interleukin [IL]-10, -4) may be critical in the development of severe falciparum malaria. Therefore, plasma concentrations of these cytokines were determined in children with various manifestations of malaria. Plasma levels of IFN-g and IL-4 were undetectable in most children. However, TNF-a and IL-10 were significantly elevated in children with high-density parasitemia and malaria anemia compared with children in control groups.

In children with mild malaria, IL-10, but not TNF-a, was significantly elevated. While the highest concentrations of TNF-a were found in children with malaria anemia, IL-10 levels were highest in children with high-density uncomplicated malaria. The mean ratio of IL-10 to TNF-a was significantly higher in children with mild and high-density parasitemia (4.64, *P* ! .005) than in children with malaria anemia (1.77). Thus, higher levels of IL-10 over TNFa may prevent development of malaria anemia by controlling the excessive inflammatory activities of TNF-a.