

## **Reduced immune complex binding capacity and increased complement susceptibility of red cells from children with severe malaria-associated anemia.**

### **Abstract:**

*Plasmodium falciparum* malaria causes 1-2 million deaths per year. Most deaths occur as a result of complications such as severe anemia and cerebral malaria (CM) (coma). Red cells of children with severe malaria-associated anemia (SMA) have acquired deficiencies in the complement regulatory proteins complement receptor 1 (CR1, CD35) and decay accelerating factor (DAF, CD55). We investigated whether these deficiencies affect the ability of erythrocytes to bind immune complexes (ICs) and regulate complement activation. We recruited 75 children with SMA (Hb  $\leq$  6 g/dL) from the holoendemic malaria region of the Lake Victoria basin, western Kenya, and 74 age- and gender-matched uncomplicated malaria controls. In addition, we recruited 32 children with CM and 52 age- and gender-matched controls. Deficiencies in red cell CR1 and CD55 in children with SMA were accompanied by a marked decline in IC binding capacity and increased C3b deposition *in vivo* and *ex vivo*. Importantly, these changes were specific because they were not seen in red cells of children with CM or their controls. These data suggest that the declines in red cell CR1 and CD55 seen in children with SMA are of physiologic significance and may predispose erythrocytes to complement-mediated damage and phagocytosis *in vivo*.