

Plasmodium falciparum: Chondroitin sulfate A is the major receptor for adhesion of parasitized erythrocytes in the placenta

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Abstract

Plasmodium falciparum parasites that sequester in the placenta bind to the molecule chondroitin sulfate A (CSA). Women become resistant to malaria during pregnancy as they acquire antibodies that inhibit parasite adhesion to CSA, suggesting that a vaccine against placental malaria is feasible. Hyaluronic acid (HA) and non-immune IgG have also been proposed as receptors for *P. falciparum* adhesion in the placenta, but evidence for their roles is inconclusive. In this study, CSA, HA, and IgG were simultaneously assessed for their relative contributions to placental adhesion. Placental parasites collected in Tanzania uniformly adhered to the molecule CSA, and soluble CSA completely inhibited adhesion of most samples to placental cryosections. Three of 46 placental parasite samples also adhered to immobilized HA, but HA failed to inhibit adhesion of any placental parasites to placental cryosections. Similarly, non-immune IgG and protein A failed to inhibit adhesion of parasite samples to placental cryosection. *P. falciparum* adhesion in the placenta appears to be a non-redundant process that requires CSA as a receptor. Vaccines that elicit functional antibodies against CSA-binding parasites may confer resistance to pregnancy malaria.