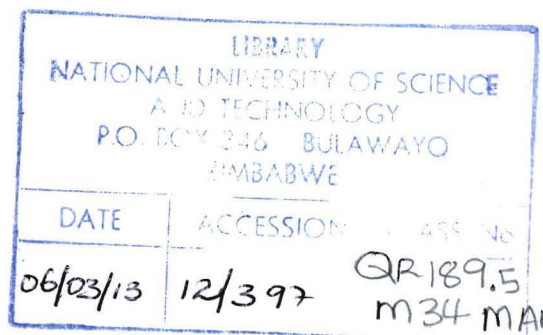# Evaluation of immune responses to malaria vaccine candidates

by

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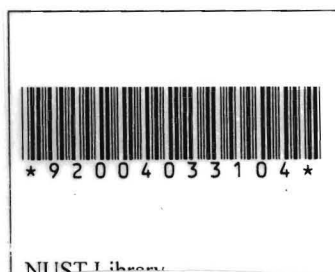
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ABSTRACT

Malaria is one of the worst public health threats of our time especially in tropical sub-Saharan countries like Zimbabwe, causing nearly one million deaths each year worldwide. There is evidence of partial protection from malaria due to protective immunity. The development of this protective immunity is slow and to be maintained, it requires exposure to multiple antigenic variants of malaria parasites and age-associated maturation of the immune system. Evidence that the protective immunity can be affected by co-infections and is associated with different classes and subclasses of antibodies reveals the importance of evaluating the quality of the immune response. In this seroepidemiological study, the humoral immune response against *Plasmodium falciparum* blood stages of children six to sixteen years of age, naturally exposed to malaria who live in endemic areas of Burma and Kariba, Zimbabwe, was evaluated using four vaccine candidates, in order to assess the prevalence of different specific isotypes, their association with different malaria clinical expressions, the effect of treatment on the antibody levels and whether schistosomiasis affects the quality of these immune responses. Afro Immuno-Assay standard procedure was used to assess the levels of antibodies; IgM, IgG, IgG1, IgG3 and IgG4 against the vaccine candidates; AMA1, GLURP, MSP1 and MSP3 at baseline, after six months and after twelve months. The data was analyzed using SPSS.v16-EQUiNOX, with the help of a biostatistician. There were high levels of antibodies and antibody isotypes specific for the vaccine candidates; particularly for AMA1 and MSP3, suggesting possible effectiveness of these candidates if developed into vaccines especially in combinations. This also confirms the theory of a protective immunity for those who are constantly exposed to the parasite; as most had *P. falciparum* in their blood without clinical symptoms. Treatment of schistosomiasis and malaria significantly reduced the amounts of antibodies specific for the various candidates and anaemia within the study population.