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Protection against disease in experimental immunization with a candidate malaria vaccine

The *Plamodium cynomolgi*- toque monkey (*Macaca sinica*) system is analogous to Plasmodium vivax in humans. Toque monkeys with prior exposure to malaria were immunized with *P. cynomolgi* 19 kDa C-terminal region of the merozoite surface protein-1(MSP 1p 19) with alum, to evaluate protection against both infection and disease. Four groups of animal were included. Animals in group 1 and 2 had prior exposure to *P.cynomolgi ceylonensis* (Pcc) malaria and groups 3 and 4 were malaria naïve. Groups 1 and 3 were immunized with MSP1p19+alum. Groups 2 and 4 were their respective adjuvant controls. Following immunization, all animals were given a Pcc natural challenge infection Axillary temperature, plasma cytokines, C-reactive proteins (CRP) and Erythrocyte sedimentation rate (ESR) were measured as indicators of disease severity.

Malaria exposed, immunized animals (group 1) were better protected against infection than malaria naïve, immunized animals (group 3), as indicated by significantly lower course of parasitaemia ($p<0.001$), and also against disease, as indicated by significantly lower temperature ($p=0.029$). CRP, ESR and TNFα IFNγ and IL-10 levels were significantly lower in group 1 compared to group 3. Group 2, the adjuvant control for group 1, showed similar protection against infection. However, their cytokine were slightly elevated and temperature was significantly higher than group 1 ($p=0.005$).malaria naïve, immunized animals (group 3) showed partial protection against infection ($p=0.01$) and disease ($p=0.037$) compared to their adjuvant controls (group 4). These results indicate that immunization of animals with prior exposure to malaria with MSP 1P 19 antigens+alum conferred significant protection against malaria infection as well as disease.