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Effect of chemokine adjuvants on immunogenicity and cross-protective efficacy of serine repeat antigen (SERA) DNA vaccine candidate against *Plasmodium berghei* in mice

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Plasmodium-derived antigens expressed during the asexual blood stage, such as serine repeat antigen (SERA), are viable vaccine candidates. However, there is a need to come up with safe and appropriate adjuvants to improve the immunogenicity of such subunit vaccines. In this study the effect of CCL5 and CCL20 as adjuvants, on the immunogenicity and cross-protective efficacy of SERA DNA vaccine was evaluated in addition to their safety, in a murine malaria model. BALB/c mice (N=132) were randomly distributed in six (6) groups which were treated as follows; SERA only (n=24), SERA+CCL5 (n=24), SERA+CCL20 (n=24), pIRES plasmid backbone (plasmid control) (n=24), Tris EDTA buffer pH 7.2 (buffer control) (n=24). Two additional groups were included for pre-immunization baseline data (n=6) and non-vaccinated control (n=6). The mice were injected with 100µg of DNA intramuscularly into each anterior *musculus tibialis* in three doses at 3-week intervals (days 0, 21, and 42). Immunization did not elicit any vaccine related adverse reactions at the injection site. Low cytokine and recall responses were observed from ELISA and mononuclear cell proliferation assays respectively. Three weeks after the last immunization, mice were infected with *Plasmodium berghei* blood stage parasites to determine cross protective efficacy. All mice developed patent parasitaemia with the SERA+CCL5 group exhibiting lower parasitaemia SERA+CCL20 group surviving longer than other groups. These findings show cross-protectivity of P/SERA in addition to illustrating potential of the immunomodulatory molecules CCL20 and CCL5 in improving protection conferred through DNA vaccines while maintaining their safety.