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Potent cellular and humoral immunogenicity of a pre-erythrocytic viral vectored malaria vaccine in African infants and children

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Vaccination is one of the most cost-effective health care interventions and an effective malaria vaccine could save half a million lives each year. We developed a prime-boost immunisation approach employing the viral vectors ChAd63 and MVA, both encoding the pre-erythrocytic malaria antigen TRAP. Previous studies with ChAd63 MVA ME-TRAP have shown excellent immunogenicity and significant efficacy in adults with protection correlated with frequency of mono-functional $CD8^+$ T cells secreting IFNγ. We report here T cell phenotypes and antibody titres measured in 138 children vaccinated during three Phase I dose-finding and age de-escalation studies to assess safety and immunogenicity of the ChAd63 MVA ME-TRAP vaccine in malaria-exposed children in The Gambia and Burkina Faso. IFNγ ELISPOT responses to TRAP in 10 week-old infants in The Gambia were high and comparable to that in adults. Anti-TRAP IgG responses varied by age group and dose, with significantly higher titres detected after boosting in vaccinees primed with a higher dose of ChAd63 ME-TRAP. Titres were also significantly higher in 5-12 month and 10 week old children than 2-6 year-old children in The Gambia that received the same dose. IgG titres in 5-17 month-old children in Burkina Faso were comparable to those in 5-12 month old children in The Gambia. IgG responses were predominantly composed of IgG1 and IgG3 isotypes and we also detected IgA and IgM responses. We demonstrate excellent cellular and humoral immunogenicity of a pre-erythrocytic malaria vaccine in key target populations for vaccine deployment.

Biography

Katie Ewer completed a PhD in 2004 at the University of Oxford and The Open University on the immunology of tuberculosis studying recently exposed TB contacts in a school in the UK, developing the T-SPOT assay for TB infection. She then spent 4 years at Defra studying immunology of bovine tuberculosis and implementing an enhanced national surveillance program using novel diagnosis techniques. She has been a Postdoctoral Researcher at the Jenner Institute for 6 years and her work focuses on defining immunological correlates of protection in vaccinated individuals undergoing controlled human malaria infection, particularly $CD8^+$ T cell-mediated immunity.

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