Antibody and T-cell responses associated with experimental human malaria infection or vaccination show limited relationships

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This study examined specific antibody and T-cell responses associated with experimental malaria infection or malaria vaccination, in malaria-naive human volunteers within phase I/IIa vaccine trials, with a view to investigating inter-relationships between these types of response. Malaria infection was via five bites of Plasmodium falciparum-infected mosquitoes, with individuals reaching patent infection by 11-12ădays, having harboured four or five blood-stage cycles before drug clearance. Infection elicited a robust antibody response against merozoite surface protein-119 , correlating with parasite load. Classical class switching was seen from an early IgM to an IgG1-dominant response of increasing affinity. Malaria-specific T-cell responses were detected in the form of interferon-γ and interleukin-4 (IL-4) ELIspot, but their magnitude did not correlate with the magnitude of antibody or its avidity, or with parasite load. Different individuals who were immunized with a virosome vaccine comprising influenza antigens combined with P.ăfalciparum antigens, demonstrated pre-existing interferon-γ, IL-2 and IL-5 ELIspot responses against the influenza antigens, and showed boosting of anti-influenza T-cell responses only for IL-5. The large IgG1-dominated anti-parasite responses showed limited correlation with T-cell responses for magnitude or avidity, both parameters being only negatively correlated for IL-5 secretion versus anti-apical membrane antigen-1 antibody titres. Overall, these findings suggest that cognate T-cell responses across a range of magnitudes contribute towards driving potentially effective antibody responses in infection-induced and vaccine-induced immunity against malaria, and their existence during immunization is beneficial, but magnitudes are mostly not inter-related.

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