Distinct B cell differentiation associated with T cell subset differences in symptomatic and asymptomatic malaria

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Humoral immunity in malaria depends on coordinated interactions between T and B lymphocytes; however, how differences in T cell subsets relate to B cell differentiation in symptomatic and asymptomatic infections remains incompletely understood. This study aimed to characterize B cell differentiation patterns and their association with T cell subset distributions in individuals with symptomatic and asymptomatic malaria. Peripheral blood mononuclear cells (PBMCs) from individuals with symptomatic malaria (SYM), asymptomatic malaria (ASYM), and uninfected controls from the Peruvian Amazon were analyzed by flow cytometry using dedicated B cell and T cell panels designed to identify naïve, activated, memory, and effector subpopulations. B cell subsets included naïve, memory, activated B cells and plasmablasts, while CD4 and CD8 T cell subsets and follicular helper T cells (Tfh) were assessed within the T cell panel. Comparative analyses were performed between groups to evaluate differences in cellular profiles and explore associations between T and B cell populations. SYM individuals showed reduced frequencies of naïve and memory B cells together with increased activated B cells and plasmablasts, whereas ASYM individuals displayed B cell profiles more similar to controls. In parallel, SYM individuals exhibited higher frequencies of activated CD4 and CD8 T cells and an expansion of Tfh cells with an effector memory phenotype. These differences in T cell subsets were associated with the distinct B cell differentiation profiles observed between SYM and ASYM groups. Overall, these findings suggest that symptomatic malaria is characterized by the expansion of effector memory Tfh cells together with increased plasmablast frequencies and reduced B cell memory, consistent with a pattern of short-lived B cell responses during infection.