

ABSTRACT

The diagnosis and control of tuberculosis (TB) has taken various dimensions with interferon Gamma (IFN- γ) Release Assays (IGRA) currently employed for diagnosis of latent TB infection while the conventional method of vaccination is *Bacille Calmette Guerin* (BCG). The variable efficacy and safety of BCG has led to a need of new vaccine candidates joining the development pipeline. However, the cellular mechanism of protection of BCG and the new anti-TB vaccines is not exhaustively understood while IGRA, offer limited applicability in terms of confirmation of an infection and distinction between latent and active TB. Various studies have explored the importance of various individual or configuration of cytokines in diagnosis as well as protection against TB. Understanding the cytokine profile in relation to TB infection would be important in understanding the host response to BCG as well as TB infection by identification of cytokine as biomarkers of disease and as correlates of protection. This study evaluated multiple cytokines elicited by *Mycobacterium tuberculosis* antigens in order to have an in-depth understanding of the cellular mechanism of infection, pathogenesis and protection from vaccine induced or naturally acquired immunity to TB. Twenty five-plex Luminex assay was utilized to analyze multiple cytokines in 25 plasma samples from BCG vaccinated children, aged 0-5 years, resident in Kisumu, western Kenya. Twelve children naturally exposed and 13 non-exposed to TB were selected based on IGRA in response to a cocktail of Mycobacterial antigens (ESAT-6, CFP-10 and TB-7.7). The results showed that the proportion and levels of inflammatory cytokines including IFN- γ , IP-10, IL-15, MIG, GM-CSF, IL-1ra, MIP-1a, IL-2, IL-2r, TNF- α , IL-7, IFN- α , IL-13 and IL-6 were significantly higher in IFN- γ positive (cases) as compared to IFN- γ negative (controls) children. However comparable cytokine frequencies and levels were observed in expression of MIP-1 β , MCP-1, Eotaxin, IL-17, IL-12, RANTES, IL-5, IL-4, IL-8, IL-10, and IL-1 β between cases and controls. This variation in individual cytokine responses between the two groups highlights the role of individual cytokines as biomarkers of infection and correlates of protection from development of active TB. The differential cytokine expression in BCG vaccinated cases and control children could be used as surrogate markers for TB diagnosis and in rational design of vaccines against TB.