IgE low affinity receptor (CD23) expression, *Plasmodium falciparum* specific IgE and tumor necrosis factor-alpha production in Thai uncomplicated and severe falciparum malaria patients

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**A B S T R A C T**

Previous studies have suggested that *Plasmodium falciparum* (P. falciparum) specific IgE in the form of immune complexes crosslinking the low-affinity receptor (CD23) on monocyte results in tumor necrosis factor (TNF)-\(\alpha\) and nitric oxide (NO) production. However, the roles of these parameters in severity and immune protection are still unclear. This study aimed to determine the association between CD23 expression on monocytes, plasma soluble CD23 (sCD23), total IgE, malaria-specific IgE and IgG, and TNF-\(\alpha\) levels in *P. falciparum* infected patients. We evaluated 64 uncomplicated (UC) and 25 severe patients (S), admitted at the Hospital for Tropical Diseases, Mahidol University, and 34 healthy controls (C) enrolled in 2001. Flow cytometry and enzyme linked immunosorbent assays (ELISA) demonstrated that trends of the CD23 expression, levels of sCD23 and specific IgE were higher in the S group as compared to those in the UC and C groups. Plasma levels of *P. falciparum* specific IgE in the UC (\(p=0.011\)) and S groups (\(p=0.025\)) were significantly higher than those in C group. In contrast the TNF-\(\alpha\) levels tended to be higher in the UC than those in the S (\(p=0.343\)) and significantly higher than those in C (\(p=0.004\)) groups. The specific IgE levels in UC were significantly higher than those in S and C (\(p<0.001\)) groups. At admission, a strong significant negative correlation was found between specific IgE and sCD23 (\(r=-0.762, p=0.028\)), and TNF-\(\alpha\) and IgE-IgG complexes (\(r=-0.715, p=0.002\)). Significant positive correlations between levels of specific IgE and TNF-\(\alpha\) (\(r=0.575, p=0.010\)), and sCD23 (\(r=0.597, p=0.000\)) were also observed. In conclusion, our data suggest that CD23 expression and malaria-specific IgE levels may be involved in the severity of the disease while TNF-\(\alpha\) and the malaria-specific IgE may correlate with protection against falciparum malaria.

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1. Introduction

There are two IgE receptors, one is the high-affinity receptor (FcεRI) that is important in allergic reactions in type I-mediated asthma. The other receptor is the low-affinity receptor (FcεRII) also known as CD23, which is important for parasite infection (Cabrera et al., 2003; Sutton and Gould, 1993; Voudoukis et al., 2011). Cross-linking of CD23 contributes to the production of tumor necrosis factor (TNF)-\(\alpha\), interleukin (IL)-1, IL-6, \(\text{H}_2\text{O}_2\) and nitric oxide (NO) through NFKB and AP-1 dependent mechanism (Voudoukis et al., 1995).

In malaria infection, elevation of IgE has been reported in areas with high malaria endemicity (Desowitz et al., 1993; Perlmann et al., 2000). Levels of total IgE and *Plasmodium falciparum* specific IgE have been shown to be higher in patients with severe malaria patients than in those with uncomplicated cases (Perlmann et al., 1994, 1997). These finding was supported in previous studies where elevated serum levels of IgE in Ivorian children (Seka-Seka et al.,...