Interleukin-27 exhibited anti-inflammatory activity during Plasmodium berghei infection in mice

ABSTRACT

Interleukin-27 (IL-27) has a pleiotropic role either as a pro-inflammatory or anti-inflammatory cytokine in inflammatory related diseases. The role and involvement of IL-27 during malaria was investigated and the effects of modulating its release on the production of major inflammatory cytokines and the histopathological consequences in major affected organs during the infection were evaluated. Results showed that IL-27 concentration was significantly elevated throughout the infection but no positive correlation with the parasitaemia development observed. Augmentation of IL-27 significantly elevated the release of anti-inflammatory cytokine, IL-10 whereas antagonising and neutralising IL-27 produced the opposite. A significant elevation of pro-inflammatory cytokines (IFN-γ and IL-6) was also observed, both during augmentation and inhibition of IL-27. Thus, it is suggested that IL-27 exerts an anti-inflammatory activity in the Th1 type response by signalling the production of IL-10 during malaria. Histopathological examination showed sequestration of PRBC in the microvasculature of major organs in malarial mice. Other significant histopathological changes include hyperplasia and hypertrophy of the Kupffer cells in the liver, hyaline membrane formation in lung tissue, enlargement of the white and red pulp followed by the disappearance of germinal centre of the spleen, and tubular vacuolation of the kidney tissues. In conclusion, it is suggested that IL-27 may possibly acts as an anti-inflammatory cytokine during the infection. Modulation of its release produced a positive impact on inflammatory cytokine production during the infection, suggesting its potential in malaria immunotherapy, in which the host may benefit from its inhibition.

Keyword: Interleukin-27; Anti-inflammatory activity; Plasmodium berghei; Mice infection; Mice