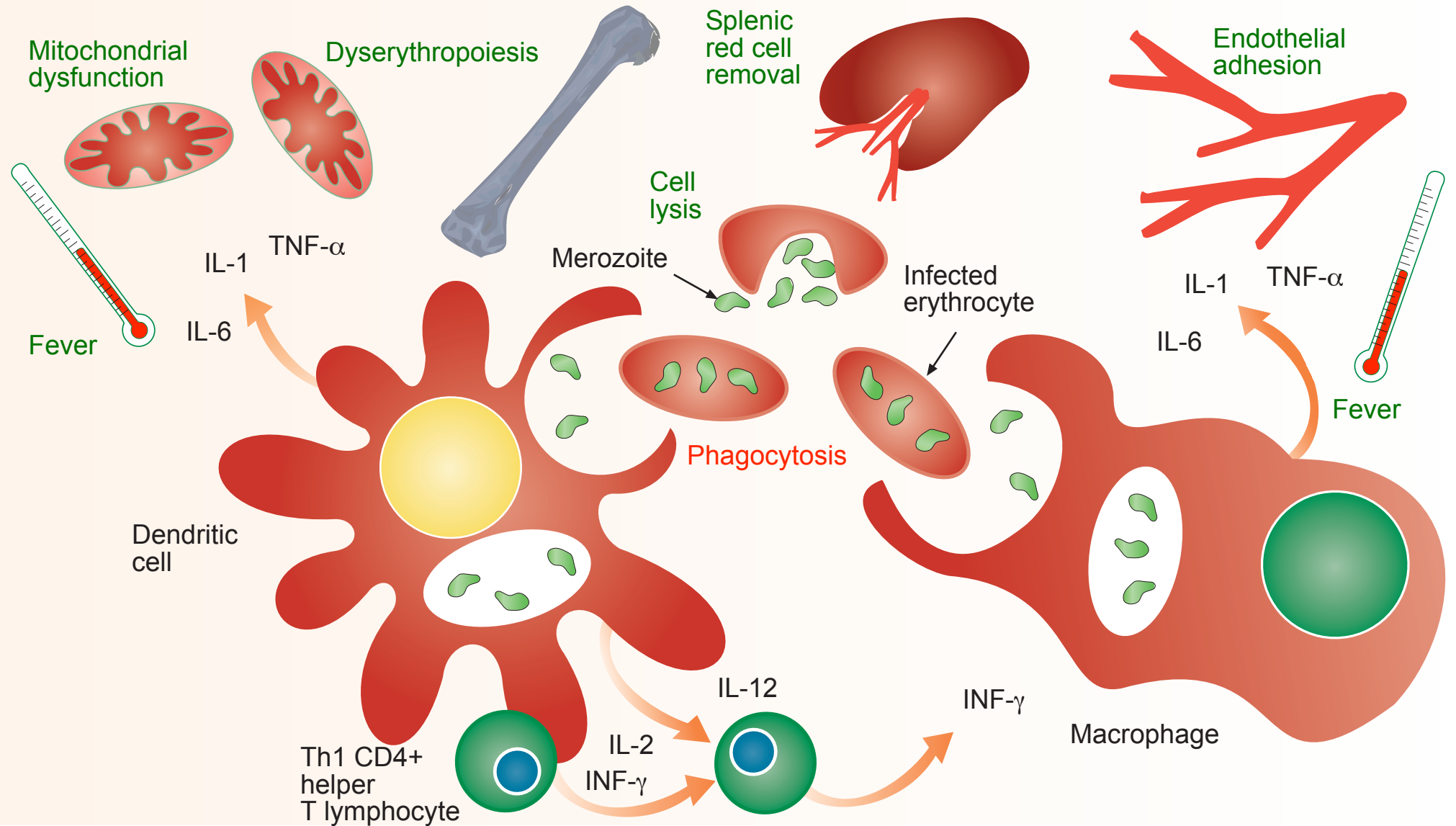


# Systemic effects of blood stage *Plasmodium falciparum* infection



Blood stage infection with *Plasmodium falciparum* is associated with high levels of pro-inflammatory cytokines such as IL-1, IL-6, TNF- $\alpha$ , IL-12 and INF- $\gamma$  and low levels of anti-inflammatory cytokines IL-10 and TGF- $\beta$ . It is thought that pro-inflammatory cytokines play a major role in causing the symptoms of malarial infection such as fever and anemia. Although lysis of infected red cells, splenic removal of infected red cells and red-cell occlusion in blood vessels contributes directly to anemia, cytokines, particularly IL-1 and TNF- $\alpha$ , play an additive role by causing mitochondrial dysfunction, bone marrow suppression and up-regulation of endothelial adhesion molecules. IL-12 promotes a Th1 Helper T cell response which increases IL-2 and INF- $\gamma$  secretion. INF- $\gamma$  further enhances macrophage function and cytokine release.