Controlling drug resistance by targeting *Plasmodium falciparum* heat shock protein 70-1, a chaperone at the centre of protein quality control mechanism: a review

Douglas A. M. Ruhwaya, Brilliant Nyathi, Gadzikano Munyuki, Ryman Shoko & Grace Mugumbate

Abstract

The survival of the malaria parasite is highly dependent on withstanding physiological stresses, which are a proportional response to parasite invasion within the hostile human host environment. Plasmodium falciparum heat shock protein 70-1 (PfHSP70-1) plays a significant role through its network of interactions with the substrate scanners PfHSP40s, the functional maturation protein PfHSP90, the nucleotide exchange factor PfHSP110c/PfHSP70-z, apoptosis and parasite homeostasis agent PfHSP60, also the Clp machinery for the unfolding and degrading of misfolded proteins PfHSP100. These proteins work together to maintain the health and function of the parasite, but also possess individual functionalities. Here, we review the functional interplay between these heat shock proteins (HSPs), highlighting the central role of PfHSP70-1, its prospects in antimalarial drug discovery and possible implications in drug resistance.

Keywords: Malaria, P. falciparum, PfHSP70-1, chaperone, protein folding