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RESEARCH ARTICLE

EhRho1 regulates phagocytosis by modulating actin dynamics through EhFormin1 and EhProfilin1 in *Entamoeba histolytica*

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Abstract

The protist parasite *Entamoeba histolytica* causes amoebiasis, a major public health problem in developing countries and a major cause of morbidity and mortality. Invasive infection in amoebiasis mostly affects intestinal epithelial cell lining but can also involve other organs, such as liver, lungs, or brain. Phagocytosis is an essential mode of nutrition in amoeba and has often been associated with virulence behaviour of *E. histolytica*. *E. histolytica* possesses a highly dynamic and actin-rich cytoskeleton that is thought to be involved in many processes, such as motility, pseudopod formation, and pathogenesis. Rho GTPases are known to be key regulators of the actin cytoskeleton and consequently influence the shape and movement of cells. Our study is mainly focused to understand the role of EhRho1 in the phagocytosis process of *E. histolytica*. EhRho1 got enriched in the phagocytic cups along with EhActin and remains attached with phagosomal membrane. However, there was no direct binding of EhRho1 with G- or F-actin, though binding was observed with the actin nucleating proteins EhFormin1 and EhProfilin1. Overexpression of dominant negative mutant or lowering the expression by antisense RNA of EhRho1 in trophozoites caused delocalisation of EhFormin1 and EhProfilin1 from phagocytic cups, which results in impairment of phagocytic process and decrease in F-actin content. The overall results show that EhRho1 regulates phagocytosis by modulating actin dynamics through recruitment of EhFormin1 and EhProfilin1 at the phagocytosis nucleation site in *E. histolytica*.