A Plasmodium falciparum bromodomain protein regulates invasion gene expression

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During red-blood-cell-stage infection of Plasmodium falciparum, the parasite undergoes repeated rounds of replication, egress, and invasion. Erythrocyte invasion involves specific interactions between host cell receptors and parasite ligands and coordinated expression of genes specific to this step of the life cycle. We show that a parasite-specific bromodomain protein, PfBDP1, binds to chromatin at transcriptional start sites of invasion-related genes and directly controls their expression. Conditional PfBDP1 knockdown causes a dramatic defect in parasite invasion and growth and results in transcriptional downregulation of multiple invasion-related genes at a time point critical for invasion. Conversely, PfBDP1 overexpression enhances expression of these same invasion-related genes. PfBDP1 binds to acetylated histone H3 and a second bromodomain protein, PfBDP2, suggesting a potential mechanism for gene recognition and control. Collectively, these findings show that PfBDP1 critically coordinates expression of invasion genes and indicate that targeting PfBDP1 could be an invaluable tool in malaria eradication.

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