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A novel, robust aptamer based gene regulatory system for functional genomics of Malaria parasites

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Malaria is a major cause of human morbidity and mortality, especially in tropical and subtropical countries. The most severe form of malaria is caused by the parasite, *Plasmodium falciparum*. A limited set of antimalarial drugs is used to treat the disease, but drug resistance is an increasing problem. Hence, identification of novel anti-malarial drugs is a high priority. While our understanding of *Plasmodium* biology has increased in the post-genomic era, tools for doing functional genetics remain quite limited. To address this need, we previously developed an RNA-Protein interaction system that facilitates robust and inducible regulation of target gene translation in eukaryotic organisms including *Plasmodium*. Here, we present the application of protein engineering approaches to integrate our synthetic control system with native *Plasmodium* translational regulatory mechanisms. In so doing, we achieved substantially increased regulatory dynamic ranges (up to 200-fold) compared to a 5-10 fold range of the original system. As a proof-of-concept, we have generated P-type cation-ATPase (PfATP4) conditional knock down *P. falciparum* strain. PfATP4 is considered to be a potential target of several antimalarial compounds. However, the importance of this protein has not been studied so far. Here, our system provides first, direct evidence for the essentiality of this gene in asexual stages of the parasite. We are currently using this tool to study multiple *Plasmodium* genes. In summary, we have developed a novel, robust and reliable gene regulatory tool for regulating gene expression over a wide dynamic range which will facilitate greater understanding of the biology of these parasites.

Biography

Suresh M Ganesan has completed his PhD from Drexel University and currently doing Postdoctoral studies from Massachusetts Institute of Technology. He has published few important manuscripts on malaria in reputed journals and has been serving as Peer Reviewer for parasitology journals.

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