Engineered resistance in Anopheles stephensi to antimalarial effectors—Effect on Plasmodium development and evolution.

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Malaria transmitted by Plasmodium falciparum progresses through various developmental stages within the Anopheles sp. and can be transmitted to humans by female Anopheles mosquitoes. In view of the efforts towards the global eradication of malaria, population modification of the vector mosquito populations by efficient introgression of antimalarial gene(s) is being explored.

A previously characterized dual effector transgenic Anopheles stephensi mosquito line expressing single chain antibodies namely m2A10-m1C3 targeting Plasmodium antigens namely Circumporozoite protein (CSP) and Chitinase, was challenged with rodent parasite Plasmodium berghei, chimeric for Plasmodium falciparum CSP antigen.

Further, these infected transgenic mosquitoes were fed on to infect a naïve mouse and the reinfected parasite was harvested at every infection cycle for four subsequent generations.

Across the four generations, there was a delay observed in the appearance of the parasite upon reinfection.

The study successfully establishes an invitro experimental evolution model which can be used to evaluate risk associated with mosquito transgenesis for the probable genetic changes in the Plasmodium antigen(s) upon the multigenerational crosstalk with the single chain effector antibodies expressed in the transgenic Anopheles stephensi.

1. What is your pathogen? Multiple options possible (e.g. if working on coinfections)
Protozoan: Plasmodium falciparum

2. On a scale of 1-5 is your work mostly eco/epidemiological or evolutionary? 5 (100% evolutionary)

3. On a scale of 1-5 is your work mostly theoretical or experimental/empirical?
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