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**Lauren M. Childs** and **Olivia F. Prosper\*** ([olivia.prosper@uky.edu](mailto:olivia.prosper@uky.edu)). *A stochastic model for the generation of Plasmodium falciparum parasite diversity.*

The malaria parasite *Plasmodium falciparum* requires a vertebrate host, such as a human, and a vector host, the *Anopheles* mosquito, to complete a full life cycle, with sexual reproduction occurring in the vector host. This sexual stage of the parasite life cycle creates opportunities for the production of genetically novel parasites. In the meantime, a mosquito's biology creates bottlenecks in the infecting parasites' development. We constructed a two-stage stochastic model to better understand the role of mosquito biology in mediating the generation of parasite diversity. The first stage is a stochastic model of parasite development within the mosquito, and the second is a model of sequence diversity generation via reassortment and recombination. Despite the bottlenecks, our framework shows that the possibility for reassortment and recombination ultimately increases the diversity of the parasite population within the mosquito at the sporozoite stage, the stage in which parasites are transmissible to humans. In fact, if the initial blood meal entering the mosquito is composed of only two parasite genotypes, the probability that more than two unique genotypes is transmitted from the mosquito to a human is over 50

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