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Potential of Retroviruses as Genetic Vectors for Mosquito Transformation

Retroviruses have served as one of the most versatile vectors for genetic transformation of vertebrates. Sequencing of insect genomes reveals many DNA proviral insertions resulting from evolutionarily recent infections by the insect retroviral equivalent, errantiviruses. One such errantivirus, gypsy, has been demonstrated in *Drosophila* to be infectious by larval feeding as assayed by permanent germ line proviral insertion. In this study, the transcriptional activity of seemingly intact proviruses in mosquito genomes will be assayed both quantitatively and for tissue-specificity. Those errantivirus proviruses found to be active are candidates for development into mosquito-specific retroviral vectors for genetic transformation. Because of their potential for genetic transformation by larval feeding, such errantiviral genetic transformation vectors could be a simple and effective means of genetically modulating mosquitoes' capability to transmit various human and veterinary pathogens, including dengue, malaria, WNV, SLE and VEE. These genetic vectors could also be used to reduce insecticide resistance in non-susceptible mosquito populations by knocking out or replacing resistance genes. While this is primarily a laboratory-based study, if successful, it could lead to development of new tools for fighting mosquito transmitted pathogens and for controlling mosquitoes.