

#9: Targeted delivery of molecular cargo into the mosquito germline

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Genetic manipulation is a powerful technique for addressing research questions in arthropods of medical importance. Current approaches rely upon delivering DNA or endonucleases to preblastoderm embryos via embryonic microinjection. However, embryonic microinjection is technically challenging, is limited to a small number of arthropod taxa, and is inefficient even in optimized species. As such, there is a critical need to develop methods for arthropod genetic manipulation that are simple, accessible for many researchers and generally compatible for a large variety of arthropod species. During oogenesis, insects transfer yolk protein precursors to developing oocytes by receptor-mediated endocytosis (RME). We are developing tools exploiting this phenomenon to specifically target DNA and protein cargo into the mosquito germline for heritable modification of the chromosomal genetic sequence. We will discuss progress in optimizing this technique and in transferring the technology to multiple mosquito species.