

Engineering the genetics of wild populations with synthetic selfish genetic elements, to fight human disease.

Mosquitoes and ticks are essential vectors for major human diseases such as dengue, yellow fever, malaria and Lyme disease. An attractive approach to suppressing these diseases involves replacing the wild pest population with modified counterparts unable to transmit disease (population replacement). An essential component of such a strategy involves the use of a genetic drive mechanism able to promote the spread of genes conferring disease resistance, even if their presence carries a fitness cost. We have developed a synthetic selfish genetic element (*Medea*) that is able to drive population replacement in *Drosophila* (Chen et al., (2007) A synthetic maternal-effect selfish genetic element drives population replacement in *Drosophila*. *Science*. 316: 597-600).

Postdoctoral positions are available to develop and characterize *Medea* elements in mosquitoes and other organisms at the molecular, genetic and population levels. We are also interested in the development of novel selfish genetic elements able to bring about local population suppression or elimination, as well as methods for engineering reproductive isolation. Population genetic engineering is an exciting new research area with many opportunities. Postdoctoral candidates should hold recent Ph.D. and/or M.D. degrees.

Postdoctoral positions are also available to study the basic biology of microRNAs and cell death in *Drosophila* and mosquitoes.

We (<http://www.its.caltech.edu/~haylab/>) are an energetic and well-funded team with modern lab space located in sunny Pasadena. We seek to expand our group with the addition of highly motivated candidates with experience in molecular and population genetics, cell biology, developmental biology and modeling. Candidates with experience in mosquito husbandry and transformation are encouraged to apply, though this experience is not essential. Close interactions with other labs at Caltech and in the Southern California area (UCLA, UC Irvine, UC Riverside) make the environment collegial and stimulating.

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