

## Sex-Specific Gene Activity: Implications for Mosquito Control

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### Abstract:

Development of novel methods of control is necessary to prevent spreading of the major human diseases transmitted by mosquito vectors. Identification and characterization of regulatory sequences required for correct stage-, tissue-, and sex-specific gene expression has a fundamental importance. We developed a model to study regulation of sex- and tissue-specific gene expression in larval mosquito. The coding region and approximately 3 kb of the 5'-flanking region of the *AatHex-1.2* gene, encoding the female-specific Hexamerin-1.2 protein of the mosquito *Ochlerotatus atropalpus* have been cloned. A putative female-specific regulatory elements containing potential binding sites for the sex-specific transcription factor Doublesex have been mapped in the 5'-flanking region. The first 0.7 kb of sequence upstream of the transcription start site is sufficient to drive expression of a reporter gene in transformed *Drosophila* lines, according to a correct spatial and developmental profile, and to partially repress reporter gene activity in males. Inactivation of the female isoform of the Doublesex transcription factor in transgenic female flies resulted in reduction of reporter gene expression to levels comparable to those in males, suggesting that Doublesex is at least partially involved in female-specific regulation of the *AatHex-1.2* gene.