The CG9109 Gene Product Functions in Dorsal Closure

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Dorsal closure is a vital developmental event in Drosophila melanogaster embryos. Dorsal closure occurs midway through embryogenesis, during this process, the lateral epithelial sheets move dorsallyward over the embryonic amnioserosa, ultimately meeting and fusing along the dorsal midline. When dorsal closure does not occur properly, developmental problems arise. Dorsal closure serves as a good model for human developmental events, including neural tube and palate closure and wound healing.

We are currently characterizing the Drosophila mmy gene, which codes for an enzyme required for protein glycosylation and is also required for dorsal closure. When mmy is mutated, a dorsal-open phenotype is obtained. We have found that CG9109 mutants generated by injection of dsRNA exhibit an identical dorsal-open phenotype. Both mmy and CG9109 clearly play essential roles in dorsal closure in Drosophila, and we hypothesize that the CG9109 gene codes for the GTPase-activating protein that functions directly downstream of mmy.

While RNAi mutations provide a significant hint to the function of a gene, they are neither stable nor heritable, and therefore difficult to study. However, experimentally useful mutations can be made by transposon insertion. First, I identified a fly line with a reported transposon insertion in the CG9109 gene and using PCR confirmed that the insertion site maps within the CG9109 gene. Second, examination of the viability of flies harboring the CG9109 insertion revealed the insertion to be a hemizygous, lethal event, indicating that the CG9109 gene is essential for Drosophila embryonic development. Finally, an analysis of the cuticular phenotype in mutative CG9109 mutants revealed a dorsal-open phenotype identical to that observed in the mmy mutant homozygotes and RNAi generated CG9109 mutants. This shared loss of phenotype provides strong genetic evidence that CG9109 functions downstream of mmy. The CG9109 mechanism of action in this pathway is currently being further dissected in molecular, genetic, and biochemical assays.

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