The "Green Pharynx" Phenotype of Transgene Misexpression Shows synMuv Genes Can Act in Novel Combinations in Contexts Other Than Vulval Fates

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In screens for mutants defective in the control of a specific cell death using the reporter *pkd-2::gfp*, we found 29 isolates that had strong, inappropriate GFP expression in the pharynx. From several clonal and nonclonal screens, we identified 68 mutants with this "green pharynx" phenotype. The green pharynx phenotype requires vector sequence in the reporter construct, consistent with previous reports of a cryptic pharyngeal promoter in the Fire vectors. Vector-driven pharyngeal expression is often inhibited by the inclusion of a promoter in the reporter; for some promoters, including *pkd-2*, this inhibition depends on a mechanism absent in green pharynx mutants.

Mutations in certain synthetic multivulva (synMuv) genes produce the green pharynx phenotype. Animals mutant in two of three classes of synMuv genes (A, B, and C), but not animals mutant in one or more members of the same class, display a multivulva phenotype. Several class B and class C synMuv genes encode proteins likely involved in transcriptional regulation and chromatin remodeling. Of 31 synMuv genes tested, four were required to prevent the green pharynx phenotype: the class A gene *lin-8* and the class B genes *hpl-2*, *lin-13*, and *lin-61*. Thus, a class A gene and three class B genes may act together in this context, although class A and class B synMuv genes act separately and in parallel to prevent vulval cell fates. This finding suggests that at least one class A synMuv gene may act in chromatin modification. Of the 68 green pharynx mutations isolated in our screens, 67 appear to be alleles of three of these four synMuv genes; because of maternal rescue, alleles of *hpl-2* could not be recovered in our screens.

The one remaining green pharynx mutation defined a new gene, *pag-6* (*pag*, pattern of reporter gene expression abnormal). *pag-6(n3599)* causes altered function of a gene encoding a novel protein. *pag-6(n3599)* is not synMuv but is synthetically lethal with selected class B synMuv mutants, including *lin-35 Rb*. The set of synMuv mutants synthetically lethal with *pag-6(n3599)* may normally provide a function that acts redundantly with *pag-6* to promote viability. This function, like that missing in green pharynx mutants, is likely one of transcriptional regulation.

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