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Drosophila Single-minded Represses Gene Transcription by Activating the Expression of Repressive Factors

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Abstract

The *Drosophila single-minded* gene controls CNS midline cell development by both activating midline gene expression and repressing lateral CNS gene expression in the midline cells. The mechanism by which Single-minded represses transcription was examined using the *ventral nervous system defective* gene as a target gene. Transgenic-*lacZ* analysis of constructs containing fragments of the *ventral nervous system defective* regulatory region identified sequences required for lateral CNS transcription and midline repression. Elimination of Single-minded:Tango binding sites within the *ventral nervous system defective* gene did not affect midline repression. Mutants of Single-minded that removed the DNA binding and transcriptional activation regions abolished *ventral nervous system defective* repression, as well as transcriptional activation of other genes. The replacement of the Single-minded transcriptional activation region with a heterologous VP16 transcriptional activation region restored the ability of Single-minded to both activate and repress transcription. These results indicate that Single-minded indirectly represses transcription by activating the expression of repressive factors. Single-minded provides a model system for how regulatory proteins that act only as transcriptional activators can control lineage-specific transcription in both positive and negative modes.

Keywords

bHLH-PAS; CNS midline; neuroectoderm; *single-minded*; *ventral nervous system defective*; *tango*.[Recommended articles](#) [Citing articles \(24\)](#)

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