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# A Germline-Specific Splicing Generates an Extended Ovo Protein Isoform Required for *Drosophila* Oogenesis

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## Abstract

Most regulatory genes are employed multiple times to control different processes during development. The *Drosophila* Ovo/Shavenbaby (Svb) transcription factor is required both for germline and epidermal differentiation, two roles also found for its ortholog *m-ovo1* in mice. In *Drosophila*, these two distinct functions are contributed by separate control regions directing the expression of Ovo/Svb in the germline (*ovo*) and soma (*svb*), respectively. We report here that alternative splicing represents an additional level of the regulation of Ovo/Svb functional specificity. Characterization of the *ovo*$^{D1rv23}$ *mutation revealed that the intragenic insertion of a novel retrotransposon,romano*, inactivates *ovo* without altering *svb*. We provide evidence that this insertion disrupts a germline-specific alternative exon, exon 2b, which encodes a 178-amino-acid internal extension (2B). While both isoforms, Ovo+2B and Ovo−2B, accumulate during oogenesis, only Ovo+2B is able to fulfill germinal *ovo* functions. Ovo−2B is unable, even when overexpressed, to fully rescue oogenic defects resulting from the absence of wild type *ovo* product. By contrast, either Ovo+2B or Ovo−2B germline protein can substitute for Svb in the epidermis. Our results emphasize the specific features of splicing in the germline, and reveal its functional importance for the control of *ovo/svb*-dependent ovarian and epidermal differentiation.

## Keywords

*ovo/shavenbaby*; oogenesis; germline; epidermis; transcription factors; alternative splicing; retrotransposon



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