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Zeste Maintains Repression of Ubx Transgenes: Support for a New Model of Polycomb Repression.

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The mRNA expression patterns of homeotic genes are initiated by spatially restricted activators and repressors that are transiently expressed in early Drosophila embryos. During later development, the anterior and posterior boundaries of homeotic expression are maintained by two groups of other, ubiquitously expressed regulators: the Polycomb repressors and the Trithorax activators. It is not known how the activities of the two maintenance systems are initially targeted to the correct genes, how they are selectively maintained on genes, or how they affect transcription. Zeste and GAGA are sequence specific DNA binding proteins previously shown to be Trithorax group activators of the homeotic gene *Ultrabithorax* (*Ubx*). Here we demonstrate that Zeste and probably GAGA are required to maintain, but not initiate, repression of the *Ubx* promoter. Further, both Zeste and GAGA bind to the mSin3A corepressor in vitro. These data strongly imply that Zeste and GAGA mediate Polycomb repression and that they do so by recruiting repressor molecules to promoters. We present a model in which the dual activities of Zeste and GAGA are an essential component of the mechanism that chooses which maintenance system functions on a given promoter