Homologous Pairing and Transvection in *Drosophila*: Rethinking the way Genes Are Turned On

**JACOB BLUM, CLASS OF 2013**

*Mentor(s): Jack Bateman*

Transvection is a form of gene regulation in which an ‘enhancer’ regulatory region on one chromosome can induce the expression of a gene on a separate chromosome when they are brought in close proximity to one another. While this phenomenon has been well-documented between enhancers and promoters in homoallelic positions on paired homologous chromosomes, we set out to study the conditions under which transvection could occur between heteroallelic regulatory regions. In each experiment, we used transposable elements to position a transgene with a *miniwhite* marker coding region and upstream ‘*hsp70*’ promoter on chromosome 2R in *Drosophila melanogaster*, and a ‘GMR’ enhancer transgene on its homologous chromosome. In total, six *hsp70-miniwhite* transgenes were inserted between zero and 2700 base pairs away from two separate GMRs. Surprisingly, the distance between *miniwhite* and GMR transgenes could not predict whether those sites were capable of transvection. The two GMR enhancers located 2700 base pairs apart showed the same ability to undergo transvection with 5 of the 6 *miniwhite* insertions, encouraging the hypothesis that characteristics of the local environment surrounding the *miniwhite* insertions such as chromatin environment may play a role in determining whether those sites are capable of heteroallelic transvection.

**Funded By:** Surdna Foundation Undergraduate Research Fellowship