

Comprehensive Solexa Based Annotation of Alternatively Spliced Transcripts in *Drosophila melanogaster* Male, Female, and *tra* Mutant Transcriptomes

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1 Abstract

Complexity in form and function is thought to arise in part by the generation of multiple protein isoforms due to alternative pre-mRNA splicing. In support of this notion is our understanding of human biology where it is estimated that alternative transcripts contribute substantially to organism complexity. The brain is an excellent tissue to use to model complex processes, given the complexity of neural circuits that underlie behaviors. A major underlying question is how are neural circuits and physiology specified by a varying environment of alternatively spliced transcripts. The *Drosophila* sex determination pathway is one of the best-studied alternative pre-mRNA splicing hierarchies and is an excellent model pathway for this analysis. Recent work in human and mouse utilized high-throughput sequencing technologies as an alternative to array based studies [?]. Our work has sought to further substantiate high throughput sequencing as an approach to assay not only the alternatively spliced sex hierarchy pathway, but also to determine the repertoire of alternatively spliced transcripts in the entire transcriptome. Double-stranded cDNA was generated from three independent biological replicates, generated from *Drosophila* heads, and subsequent mRNA purification and fragmentation. Two technical replicates per biological replicate were generated for Illumina sequencing in *Drosophila melanogaster* male, female, and chromosomally XX *tra* mutant backgrounds. De novo computational analyses to identify putative and novel splice junctions, alternatively spliced transcripts, transcription start sites and sequencing error is ongoing. Currently this approach is being expanded to *D. simulans* and *D. yakuba*. Preliminary results from initial analysis of the sex hierarchy genes reveals strong signals of splice junctions from which the annotation of alternatively spliced junctions is possible.

References

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