

# Annotation of the gene *Sox102F* on the dot chromosome of *Drosophila eugracilis*

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## Introduction

- Muller elements have gone through many rearrangements in the evolutionary history of *Drosophila*.
- Muller element F, the dot chromosome, is found in *Drosophila*.
- Dot chromosome contains both euchromatin (transcriptionally active) and heterochromatin (transcriptionally silent).
- These elements seem to be shrinking across a number of different species within the *Drosophila* genus.

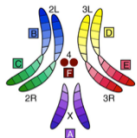


Fig 1. Representation of chromosomes in *D. melanogaster* as a reference.

## Workflow

- Contig 28 claimed using GEP Project Management system and gene *Sox102F* is selected for annotation.
- Gene was verified to lie within the contig using BLAST results.
- Annotation and isoforms were separated.
- NCBI BLAST gave exon coordinates and reading frames for acceptor and donor regions were input into a workbook for recording purposes.
- Flybase BLAST database gave a comparison against *Drosophila melanogaster*, and exon coordinates were either verified or modified.
- Coordinates were confirmed with Gene Model Checker.

## Results

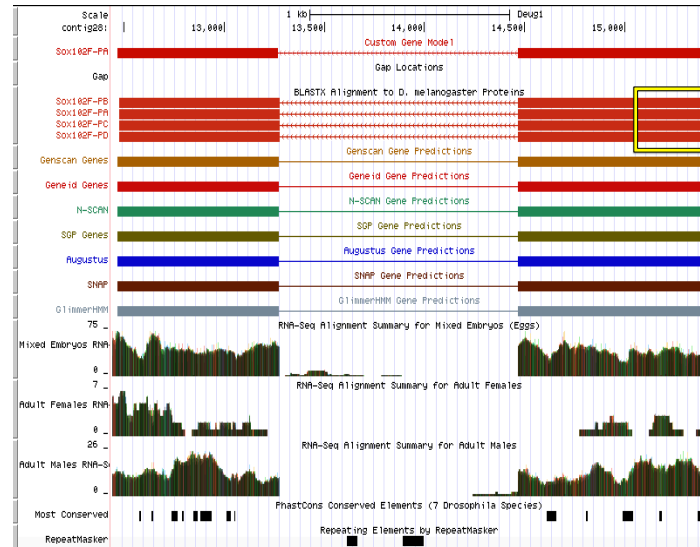


Fig 2. *D. eugracilis* BLAST results against *D. melanogaster* reveal possible exon differences and isoforms alongside gene model from Gene Checker.

- There are two unique sequences in the rightmost exon. (Fig 2)
- Notice no RNA Sequence data in *D. melanogaster* – suggests that it is not present. (Fig 2)
- One straight line shows no loss of genetic information but gaps between visually represent differences between *D. melanogaster* and *D. eugracilis* sequences. (Fig 3)

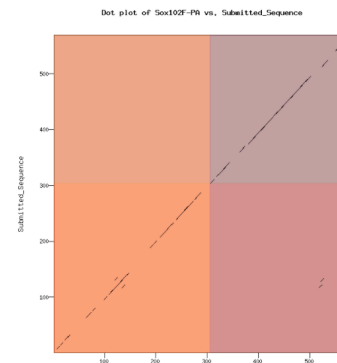


Fig 3. Dot plot of *Sox102F-PA* exon of *D. eugracilis* against *D. melanogaster* visually illustrates similarities in exon.

## *Sox102F*

- Sox102F* gene in *D. melanogaster* previous linked as a transcription factor crucial in the development of the heart and cardiac function and cardiovascular system in the wing. (Fig 4)

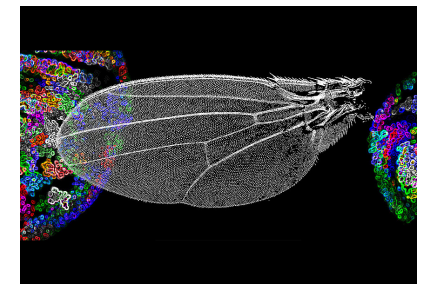


Fig 4. Cardiovascular system in wing vein development and pattern

## Conclusion

- There is an 83.2% similarity in the protein sequence, and 3.6% gap.
- This suggests that much of the sequence between the two species is the same.
- There is moderately high sequence homology on the isoforms *Sox102F-PB*, *Sox102F-PC*, and *Sox102F-PD* between species *D. eugracilis* and *D. melanogaster*.
- Sox102-PB* isoform of the exon is not found in *D. melanogaster*, and must have been lost somewhere along the way evolutionarily.
- Further research could increase the knowledge surrounding the difference in functionality of the *Sox102F-PB* isoform in the *D. melanogaster*, as it is not likely found in the species *D. eugracilis*.