

4-17-2013

Research exercise: The Ancestry and Evolution of the Fruit Fly t_MSE Cis-Regulatory Element

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"Research exercise: The Ancestry and Evolution of the Fruit Fly t_MSE Cis-Regulatory Element" (2013). *Stander Symposium Posters*. 307.

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The Ancestry and Evolution of the Fruit Fly *t*_MSE

By: Connor McNamee

Advisor: Tom Williams, Ph. D.

Department of Biology, University of Dayton

Transgenic Analysis

*t*_MSE activity visualised via *EGFP*

Introduction

Drosophilinae fruit flies display wide range of abdominal pigmentation patterns

These patterns are due to the activity of regulatory elements, including *cis*-Regulatory Elements (CREs), which specify and time and place other genes controlling pigmentation are activated.

Sexually dimorphic pigmentation in *D. melanogaster*, not observed in *D. pseudoobscura* or *D. willistoni* is regulated via the *tan* Male-Specific Element (*t*_MSE) CRE.

Sequence Alignment

Sequences were aligned based upon strong similarity using the CHAOS/DIALIGN program



D. melanogaster



D. pseudoobscura



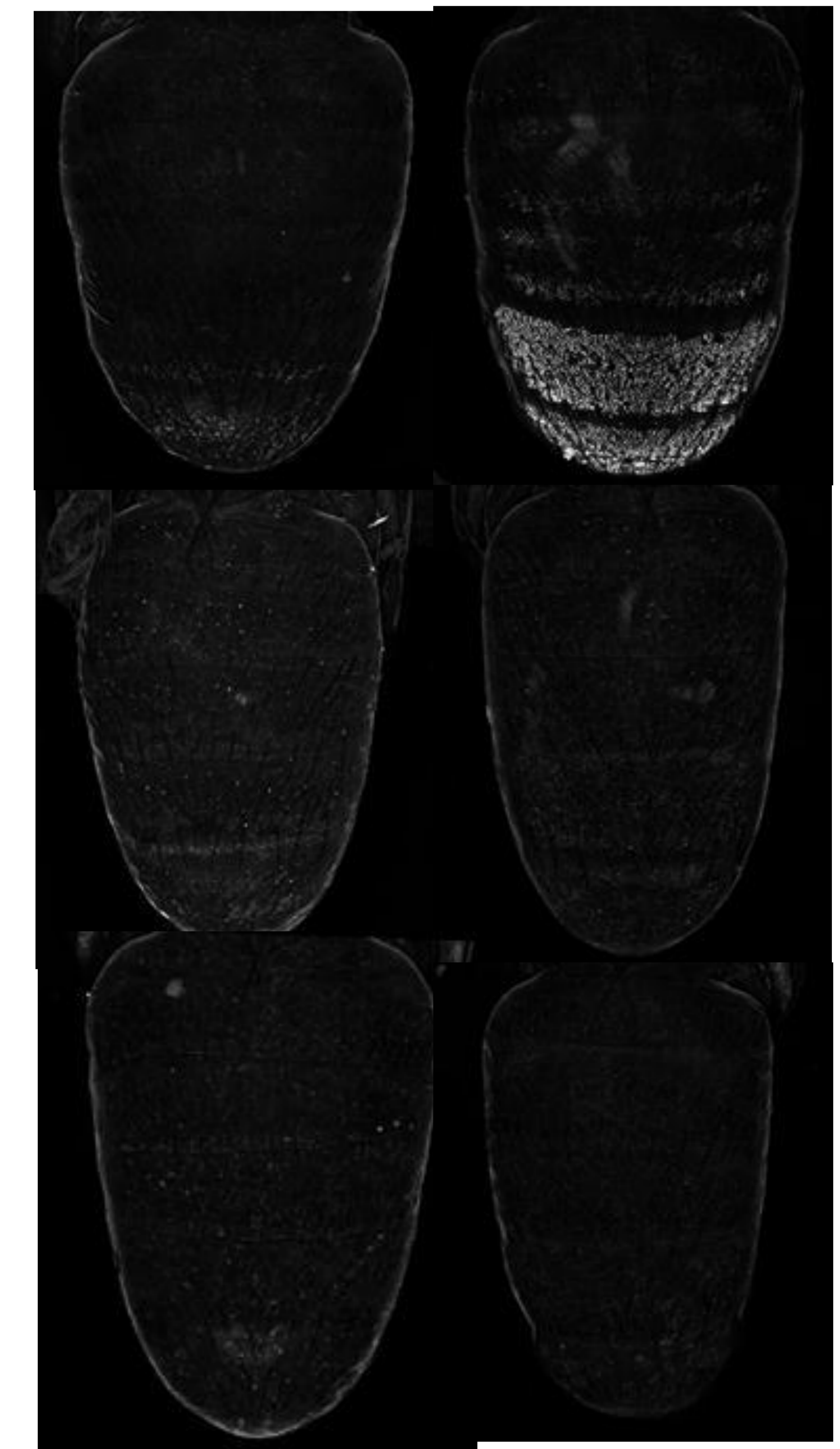
D. willistnoi



D. simulans

mel (.04JCB)	193	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.04D	161	CTGAGAACAG	TAATCCATGT	ATGAATATAC	CAAACACGAT
mel.04E	161	CTGAGAACAG	TAATCCATGT	ATGAATATAC	CAAACACGAT
mel.17C	201	CTGAGAACAG	CAATCCACT	-----	CGAT
mel.17D	201	CTGAGAACAG	CAATCCACT	-----	CGAT
mel.21	201	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.29A	201	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.29E	201	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.51D	161	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.55C	161	CTGAGAACAG	TAATCCATGT	ATGAATATAC	CAAACACGAT
mel.55D	161	CTGAGAACAG	TAATCCATGT	ATGAATATAC	CAAACACGAT
mel.59A	161	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.64	161	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel.64B	161	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
mel (genome)	198	CTGAGAACAG	TAGTCCATGT	ATGAATGTAC	CAAACACGAT
sec (genome)	198	CTGAGAACAG	TAATCCACT	-----	CGAT
sim (genome)	198	CTGAGAACAG	CAATCCACT	-----	CGAT

The .17 *t*_MSE was identical to that of *D. simulans*



No *t*_MSE activity



Conclusions

Origin of *t*_MSE Introgression prior to /incomplete speciation