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# Localization of Transgenes for Drosophila Models of Myotonic Dystrophy Type 1

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# Localization of Transgenes for *Drosophila* Models of Myotonic Dystrophy Type 1

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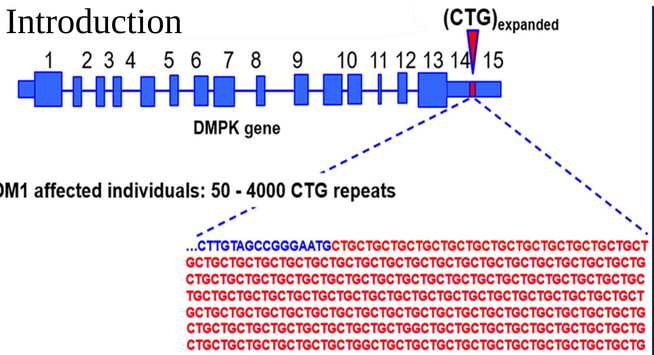
## Introduction

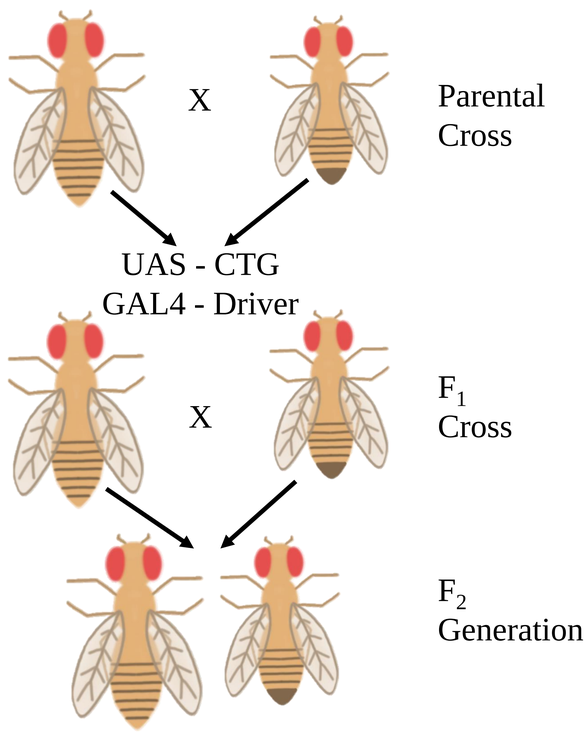



- Increased number of repeats has increased severity.

## *Drosophila* in DM1 Research

- Transgenic DM1 *Drosophila* lines contain either 60, 250, or 480 CTG repeats. [1,2]
- Many of the driver *Drosophila* lines have not been used to express DM1 transgenes previously.

## Methodology




Phenotypes that show the ratios in $F_2$ Generation:

- Eye color
- Climbing capabilities[3] and flight capabilities[4]
  - Shown to be deficient in DM1 expressing flies
- Skeletal muscle density

Genetic Crosses → Climbing Assay → Flight Assay → Muscle Histology

Image (right) of muscle sections comparing muscle loss of DM1 and severe DM1 to control (MHC-GAL4). Image from Garcia-Lopez *et al. PLoS One*. 2008.

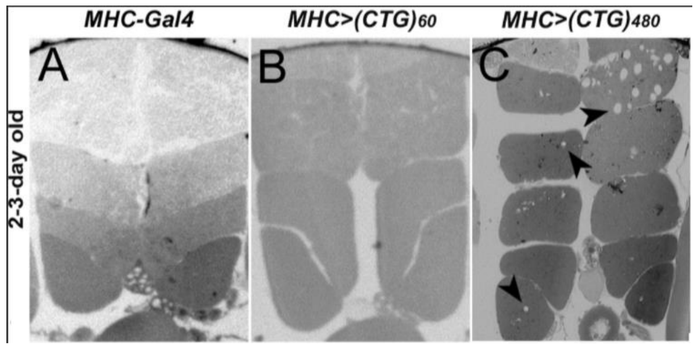



Image (left) of salivary gland dissection from 3rd instar larvae.

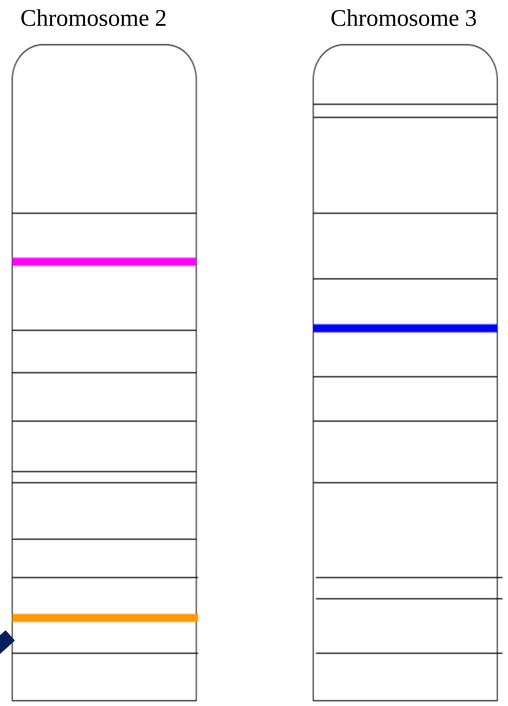
Isolate and purify DNA from 3rd instar larvae from each line

Design primers for long range PCR and create probe for transgenes and chromosome 1, 2, and 3 via nick translation

Dissection of 3rd instar larvae salivary glands

Fluorescent *in situ* hybridization of transgene and chromosome probes to isolated chromosomes and counterstaining with Hoechst stain

Observe fluorescence of probes under microscope




Example (above) of what could be seen after FISH is conducted with $CTG_{250}$ labeling, Chromosome 2 (left) possess two fluorescent bands indicating presence of transgene (pink) and the chromosome specific band (orange), as opposed to chromosome 3 (right) that shows only the chromosome-specific fluorescent band (blue).

## Results

The presence of white eyed flies in the $F_2$ progeny indicate chromosomal location.

Cross: UAS – CTG x Hsp70-Gal4 (on the 2nd chromosome)

- Present
  - $(CTG)_{60}$
  - $i(CTG)_{480}$
- Absence
  - $(CTG)_{250}$

## Conclusions

The preliminary results suggest:

- $(CTG)_{250}$ is likely localized to chromosome 2.
- $i(CTG)_{480}$ and $(CTG)_{60}$ are not likely localized to chromosome 2.

## Future Research

This project is ongoing. After classical genetics indicate chromosomal location, fluorescent *in situ* hybridization (FISH) of polytene chromosome preparations will be used to narrow down their location on the chromosome. Then PCR and sequencing will be used to verify the location. This information will be used to assess contributions of signaling pathways in DM1.

## References

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## For Further Information

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