## Vita

Candidate's name: Lauren Marie Miller

Universities Attended:
Memorial University of NFLD (2016)
Bachelors of Science

University of New Brunswick (2020)
Masters of Science
Biology

**Publications / Conference Presentations:**

Miller, L., Jackson, M., & Clark, D. Activity of a *Drosophila teissieri* I-element retrotransposon in *Drosophila melanogaster.* (Manuscript in preparation)

Miller, L., Jackson, M., & Clark, D. Activity of a *Drosophila teissieri* I-element retrotransposon in *Drosophila melanogaster.* Poster presentation at the CanFly Conference, Toronto, May 2019

Miller, L., & Clark, D. The role of the retrotransposon I-element protein ORF1p in *Drosophila*: RNA binding in the female germline. Verbal presentation at the University of New Brunswick's Graduate Research Conference, Fredericton, March 2019

Miller, L., & Clark, D. The role of the retrotransposon I-element protein ORF1p in *Drosophila*: RNA binding in the female germline. Verbal presentation at Concordia University's Chemistry and Biochemistry Graduate Research Conference, Montreal, November 2018

Miller, L., & Clark, D. The role of the retrotransposon I-element protein ORF1p in *Drosophila*: RNA binding in the female germline. Verbal presentation at the University of New Brunswick's Graduate Research Conference, Fredericton, March 2018

Miller, L., & Clark, D. The role of the retrotransposon I-element protein ORF1p in *Drosophila*: RNA binding in the female germline. Proposal presentation to the Department of Biology at the University of New Brunswick, Fredericton, September 2017

# Activity of a *Drosophila teissieri* I-element retrotransposon in *Drosophila melanogaster*

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

**Lauren Marie Miller**

in the Department of Biology

U.N.B., Fredericton, N.B.

**Thursday, September 17th, 2020**
**2:00 p.m.**

Via MS TEAMS

Examining Committee

| | |
|---|---|
| Dr. Denise Clark | Supervisor |
| Dr. Jason Addison | Internal Examiner |
| Dr. Yang Qu | External Examiner |
| Dr. Les Cwynar | Chair of Oral Examination |

## Abstract

Transposable elements play an important role in evolution, affecting genome structure and gene regulation. A retrotransposon reverse transcribes its own RNA to create a cDNA copy that is inserted in the genome, and its machinery can reverse transcribe other RNAs to produce retroduplications. The human L1 retrotransposon gene product ORF1 protein (ORF1p) has RNA-binding activity, while the ORF2 protein (ORF2p) is a reverse transcriptase and has endonuclease activity. The transposition of the I-element, an L1-related retrotransposon in *Drosophila* species, has been studied *in vivo*. In this study, a cloned *D. teissieri* I-element was used to explore binding preferences of ORF1p to cellular transcripts in the germline to contribute to understanding the process of retroduplication. To determine the types of RNA that are associating with ORF1p, three transgenic *D. melanogaster* strains were constructed. One transgenic strain expresses an epitope-tagged HA-ORF1p. Expression of HA-ORF1p in ovaries, followed by immunoprecipitation to isolate ribonucleoprotein particles (RNPs) bound to HA-ORF1p, would allow for the ORF1p-bound RNAs to be isolated. The other two transgenic strains were used to assess the full-length I-element clone for its ability to transpose, and to determine if the HA epitope tag in ORF1p affects this transposition. I determined that there is RNA expression of the I-element transgenes while using a *GAL4* driver; however, assays used to detect new DNA copies of the I-element were negative, as were assays to detect female sterility induced by I-element activity, suggesting that this I-element has little to no transposition activity.