Growth Comparison of Natural Abundance, 5% and 95% ^{13}C labeled *C. elegans*

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Introduction

The nematode *Caenorhabditis elegans* is one of the best studied animals on earth. It has both self-fertilizing hermaphrodites and males, about 1000 cells, a simple nervous system with 300 neurons, and is a nearly perfect genetic model organism with a 3.5 day development time from fertilized egg to adults. Numerous biological and medical discoveries have been made using this organism making it ideal for the study of metabolomics. We are interested in measuring the effect of Carbon-13 (^{13}C) labeling in the development of the worm.

C. Elegans Life Cycle

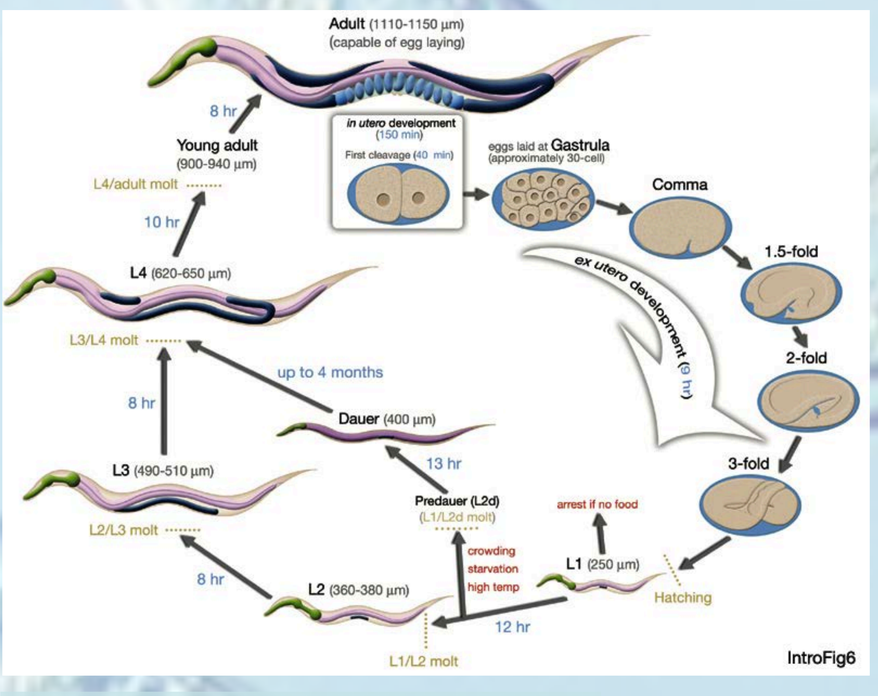
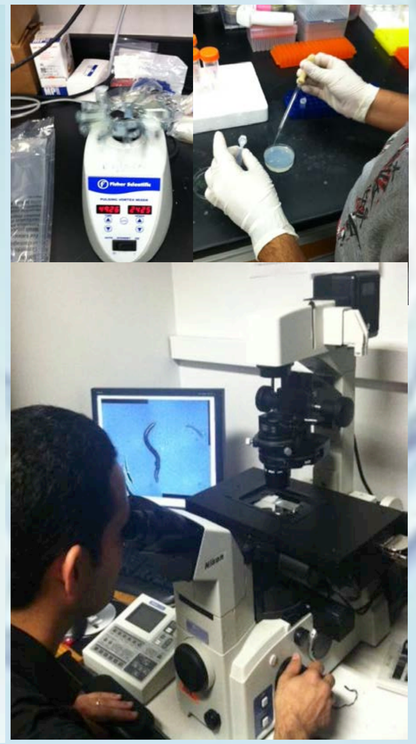


Figure 1. Life cycle from of *C. elegans* from egg to adult.

Procedure

Synchronized *C. elegans* animals were fed natural abundance (NA), 95% ^{13}C and 5% ^{13}C labeled bacteria (Escherichia coli). A 1.6X Stereo microscope was used for observations and a 10X Inverted microscope was used to are used to take photographs approx. every 3 hours. The sizes of the worms were then measured using Matlab and Wormsizer.



Growth comparison pictures

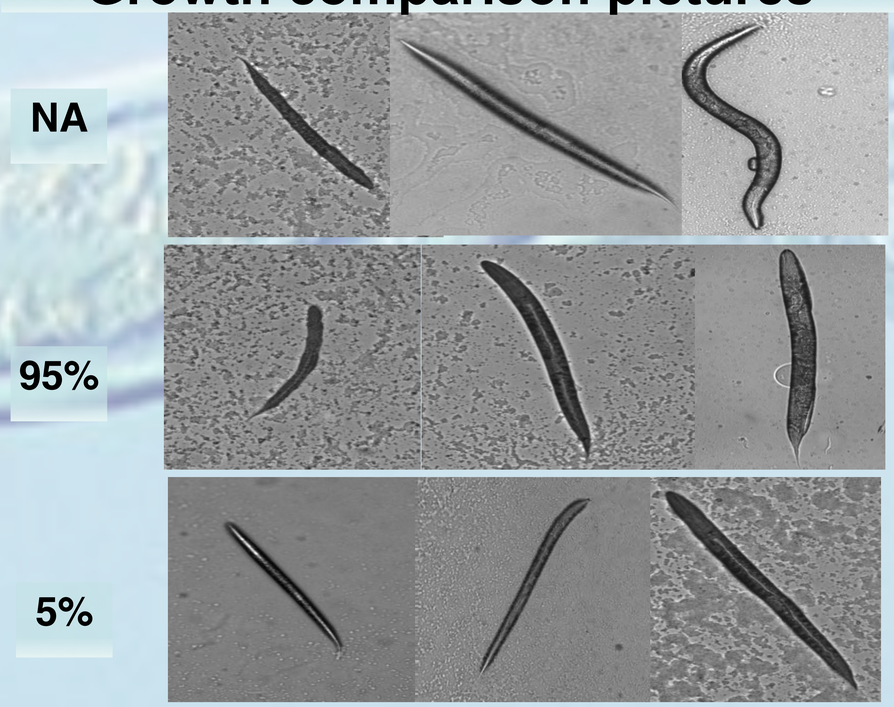


Figure 2. *C. elegans* photographs acquired with 100X inverted microscope showing different developmental stages of the worms.

Results

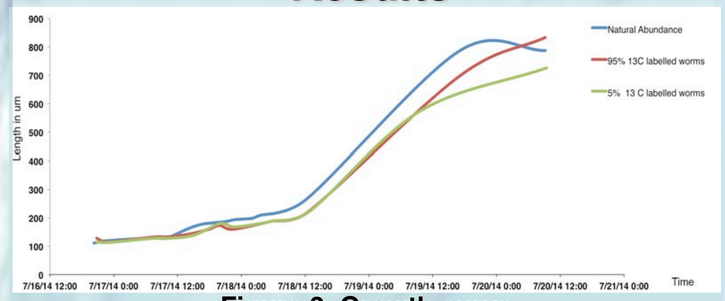


Figure 3. Growth curve

Our study suggests there are no significant differences in the growth of the 95% and 5% 13C labelled worms versus the natural abundance worms. Even though our results are preliminary, we demonstrate an effective method to measure the development of *C. elegans* and conclude that the variation in size of the differently labeled worms is not greater than the one of worms grown in the same conditions.

Conclusion

The collected data reflects the effects of C13 labelling on the development of *C. elegans,* which contributes to our understanding of IROA experimentation. IROA is novel technique that will allow us to perform global metabolomics and provide a deeper understanding of basic biological questions.

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