

Introduction

-Transdifferentiation or direct cell reprogramming is defined as a switch of one cell type to another resulting in the loss of one cellular characteristic and gain of the other.

-We currently do not understand how cellular context influences a cell's susceptibility to be directly reprogrammed.

-We hypothesize that PHA-4, a transcription factor exclusively expressed in the intestine, pharynx, and uterus, may have a role in establishing the cellular context that results in transdifferentiation into intestine.

- Uncover the process behind transdifferentiating cells into different cell-types from different germ layers without going through the intermediate pluripotent stage of a cell's life

Future Methods

- Deplete PHA-4 starting in early stage larvae (L1) using feeding RNA interference.

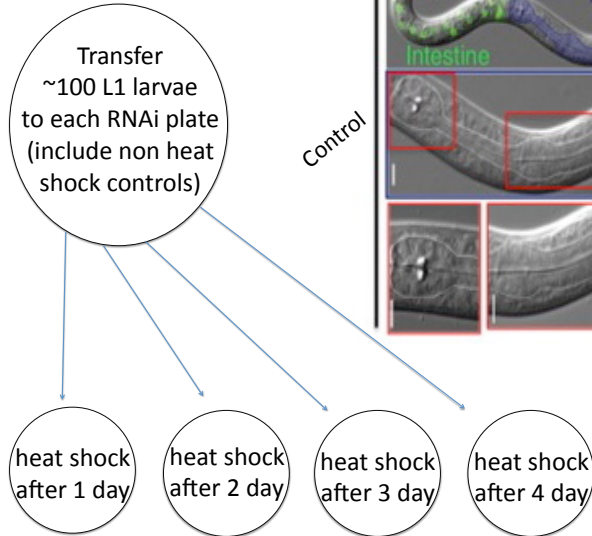
- Induce GATA factor expression via heat shocking inducible promoter (30-33°C for 30 minutes)

- Study the morphological effects of induced expression of a specific GATA transcription factors.

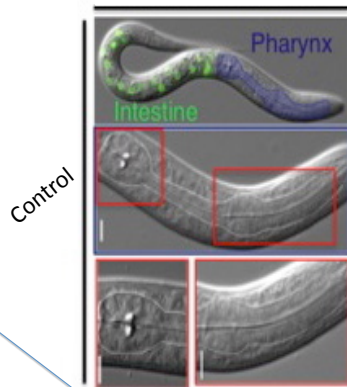
Past Results

The graphs and pictures below show us the ectopic expression of an intestine-specific GATA transcription factor, ELT-7, resulting in the pharyngeal cells transdifferentiating into intestinal cells. It has also been shown to have similar reprogramming effects in the uterus.

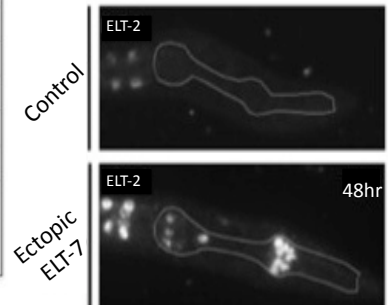
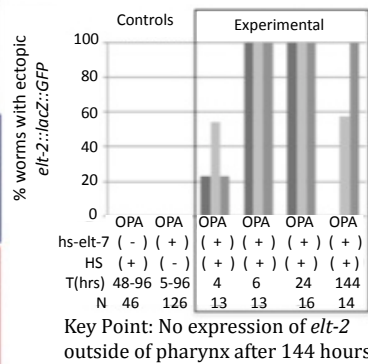
Future Methods using RNA interference (RNAi)



hs-elt-7; elt-2::lacZ::GFP



Expression of *elt-7* via heat shock inducible promoter



Discussion / Anticipated Results

Our goal is to determine the reprogramming susceptibility of the pharynx and uterus into intestine after knocking down PHA-4 using feeding RNA interference. We anticipate that by knocking down PHA-4, there will either be a decrease or increase in the expression of *elt-2* after the GATA (*end-1* or *end-3*) is expressed via a heat shocking inducible promoter. With these observations we can determine how necessary the presence of PHA-4 is in making the pharynx and uterus more or less susceptible to be transdifferentiated.

Literature Cited

Misty R. Riddle, Abraham Weintraub, Ken C. Q. Nguyen, David H. Hall, Joel H. Rothman. 2012. *In vivo* Transdifferentiation and Remodeling of Fully Differentiated Somatic Cells by a Single Transcription Factor.

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For Further Info

Please contact alexanderatamian@gmail.ucsb.edu. More information about this and related projects is available at: <https://labs.mcdcb.ucsb.edu/rothman/joel/labpage.htm>