Questions:

- How do modulators of the mTORC2 signaling pathway function to regulate organismal growth and lipid transport in C. elegans?
- What effects do activating mutations have on defects in mTORC2?

Objectives:

- Determine how novel (rhd168) and existing (ft15) sgk-1 gain-of-function mutations genetically interact with a rict-1 loss-of-function mutant through analysis of vitellogenin reporter expression and body size.
- Determine whether a pdk-1 gain-of-function mutation (mg142) further enhances sgk-1 gain-of-function activity.
- Assess the genetic relationship between F-box and sgk-1 using gain-of-function alleles.

Methods:

1. Identification of Mutations via Forward Genetic Screening

2. Generation of Mutant Strains

Conclusions:

- There is no significant difference in body size between novel and previously characterized sgk-1 gain-of-function mutations.
- A gain-of-function mutation in pdk-1 can further restore body size, but not vitellogenesis phenotype, of sgk-1 mutants in a rict-1 loss-of-function background.
- sgk-1 gain-of-function mutations do not suppress the F-box overexpression phenotype.

Future Directions:

- Perform a lifespan assay on existing strains to further characterize the effects of sgk-1 and pdk-1 on rict-1 loss of function.
- Quantify reporter expression to confirm effects of sgk-1 and pdk-1 on vitellogenesis.
- Specify the downstream effects of pdk-1 gain-of-function alleles by crossing Akt mutants into existing strains.
- Perform whole-genome sequencing to identify mutations suppressing F-box overexpression.

References:


Acknowledgements

Thanks to Dr. Rob Dowen for sponsoring and supporting me during this project and to Kendall Kanakanui for mentoring me and taking the time to make sure I understood our research as well as everybody in the Dowen Lab for their continued assistance!