Utilization of a Novel Method of RNA Interference in Caenorhabditis elegans to Conduct a Phenotypic Analysis of the daf-2 and daf-16 Longevity Genes

Jagarlamudi, Rincon (School: Marquette High School)

The daf-2 and daf-16 genes have been highlighted for their reciprocal activity in altering longevity in the model organism Caenorhabditis elegans. Both daf-2 and daf-16 present orthologs in the human genome that maintain similar function. The most straightforward method for analyzing the impacts of these genes on worm phenotype is through RNA interference. This can be accomplished by feeding Escherichia coli containing double stranded RNA intended to make the target gene inoperative in the nematodes. However, as the worms age, consumed E. coli can colonize the gut, resulting in a pathogenic infection. As part of the following research, a novel procedure for RNA interference with Bacillus subtilis was tested and developed. With this novel system, RNA interference with daf-2 and daf-16 were analyzed and compared with the results yielded through RNA interference with E. coli. The results from the study indicate reduced bending and maneuverability among daf-2 mutants suggesting that successful interference is achieved. This study demonstrates that using B. subtilis as a feeding vector is the superior course of action for RNAi in C. elegans.

Awards Won: