An Investigation into Immune Properties of Tetrahymena: The Effect of Environment and Genotype on Tetrahymena thermophila Dicer Upregulation, Survival, Morphology, and Phenotype

Floyd, Tyrell

Mancera, Anna

Tetrahymena thermophila is a single-celled eukaryote that possesses the remarkable ability of viral immunity. No virus has been identified that is capable of infecting Tetrahymena. Our research investigates Tetrahymena's antiviral properties through the analysis of the RNA pathways within the cell. Previous experiments have indicated that the Dicer Like pathway may be linked to Tetrahymena's immunity. When Dicer Like inhibited cells were exposed to filtered pond water samples, with the intent of introducing waterborne virus, slowed population growth occurred, suggesting viral infection. However, population growth may not have been an indicator of viral infection. Current research aims to identify phenotypes of infection within Tetrahymena cells though the analysis of physical and behavioral indicators of cells stress in addition to the upregulation of the Dicer genes when exposed to dsRNA producing E. coli, synthetic dsRNA and pond water. Our data indicates that when the Dicer Like inhibited Tetrahymena were exposed to dsRNA, more morphological abnormalities occurred than their control counterparts. When Wild Type cells were exposed to synthetic dsRNA (poly: I.C.), and dsRNA from E. coli Unc-22 and pond water, an upregulation of Dicer-2 RNA occurred. Dicer 1 upregulation occurred when cells were electroporated and exposed to polyI:C suggesting Dicer-1 manipulates internal immune functions. Our data suggests that the Dicer gene is responsible for Tetrahymena thermophila 's viral immunity.

Awards Won: