CALIFORNIA STATE SCIENCE FAIR
2015 PROJECT SUMMARY

Name(s)

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Project Number

S1517

Project Title

Gentamicin Assay: A Study of the Effects of Gene Suppression on E. coli Infectivity Rates

Abstract

Objectives/Goals

To determine whether exocyst component targeting siRNAs, when introduced to fifty-fifth generation HeLa cells, will cause an effect on InlB-mediated entry levels of Listeria into HeLa cells.

Methods/Materials

HeLa (cancerous human cervix cells) cells were injected with various siRNAs, changing their genetic makeup. They were then infected with E. coli Yersinia bacteria, the growing plate was sterilized, and the human cells were broken open. The number of bacteria that had survived the sterilization by successfully infiltrating the human cells was counted and compared between the eight different groups of HeLa cells. The number of bacteria present after sterilization was indicative of the effect of the change the siRNA caused on cellular defense.

Results

The siRNA seemed to affect the entry rates, especially in the VAMP 3 well samples, decreasing the entry levels from the control siRNA sample#s 5 colony entry to 1.5 in one case. In response to these results, an unpaired t-test utilizing a two-tailed P value was used to compare the VAMP 3 values and the control siRNA#s values. This test resulted in a P-Value of .0376, meaning the VAMP 3 siRNA was significantly different from that of the control. This strongly suggests the siRNA did indeed make a difference in the entry levels of E. coli.

Conclusions/Discussion

While the data is statistically insignificant due to a lack of time to perform more tests, all tests performed point towards the alternate hypothesis of the siRNA causing a change in infection rates being correct. The fact that the siRNA affected samples had different entry levels when compared to the control strongly indicates that siRNA has a measurable effect on entry levels. Further tests conducted after my project was complete by the lab I had been working at support my findings.

Summary Statement

A study of the effects of small interfering RNA gene-suppression on the cellular defense of HeLa cells to E. coli Yersinia.

Help Received

Used lab equipment and learned basic sanitation procedure under the supervision of Dr. Keith Ireton