CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY

Name(s)
Deepika C. Bodapati

Project Number
S1702

Project Title
A Novel Use of Diatoms for Endotoxin Detection

Abstract

Objectives/Goals
Goal 1 - Grow the diatoms
Goal 2 - Get the diatom to engulf the LAL molecule - to create packaging for LAL
Goal 3 - The LAL engulfed diatom must detect endotoxin consistently and accurately
Goal 4 - Create standard curve of the test
Goal 5 - Manipulate the diatoms to grow on a flat surface - to create a prototype of the home test kit

Methods/Materials
Materials: Diatoms, LAL test, CR1-S/CR1-SD, TSB, flat objects (slides), Antibiotic cocktail.
Methods:
Melt soft agar and add diatom culture in it. Perform Pasteur Pipette Method. Observe for growth. Add TSB and Antibiotic Cocktail. Aspirate and discard. Perform LAL Test. Read at photospec at 410 nm. Grow diatoms on flat surface. Perform LAL test. Incubate. Observe. Create a 3 times dilution series of the LAL test
Read on the photospec at 410 nm. Add diatoms and wait for the diatom to absorb LAL molecule. Read under photospec at 410 nm. Grow diatoms in a solution. Add flat surface to the solution. Observe results.

Results
Goal 1 # The diatoms grew successfully in the TSB solution
Goal 2 # From the readings of the photo spectrometer, the LAL was engulfed by the diatom, thus successfully using the diatom to create packaging for the LAL
Goal 3 - The LAL engulfed diatom changed color accurately in the presence of endotoxin.
Goal 4 # A standard curve was made to allow for toxic levels of endotoxin be determined
Goal 5 # Through the starvation of silica, the diatoms grew consistently on the flat glass surface, thus creating a prototype for an endotoxin detection home test kit.

Conclusions/Discussion
Though I reached my intended goals, I am working on the following experiments to fine tune my test.

Develop a method to uniformly grow diatoms on a surface
Test with other types of diatoms

Look for other uses of test in water and food industry

Summary Statement
Diatoms are mainly used as efficiency enhancers on solar cells; I will marry the commercial Limulus Amebocyte Lysate test to the absorptive and reflective properties of diatoms to essentially create an endotoxin detection test.

Help Received
My mentor, Sarah Perry, supervised my experiments to ensure that I was using safe lab technique.