CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)

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Project Number

22314

Project Title

Growth Factor Rescues Cell Growth Following Bcr/Abl Inhibition by STI571

Abstract

Objectives/Goals

The purpose of the experiment was to examine the effect of STI571 on the growth of Bcr/Abl positive and Bcr/Abl negative cells in the presence and absence of growth factor.

Methods/Materials

There was a series of five pre-experimentation pilot tests leading up to the final experiment. In the final experiment, cell lines expressing only the E2a/Pbx protein and cell lines expressing both E2a/Pbx and Bcr/Abl were cultured in various concentrations of growth factor, with or without STI571. There were four plates total with 12 wells each. After a 72-hour incubation period the cells were quantified using a hemocytometer and a microscope. There were two sets of data for this experiment as each concentration of growth factor was repeated twice per plate of cells.

Results

Plate 1, with no Bcr/Abl and no STI571 grew according to the concentration of growth factor. Plate 2, with no Bcr/Abl but with STI571, also grew according to the concentration of growth factor but had overall less cells than plate 1. Plate 3, which had Bcr/Abl but no STI571 grew independent of the concentration of growth factor. Plate 4, with both Bcr/Abl and STI571, grew according to thep concentration of growth factor. Also a threshold of concentration of growth factor was observed, where with less than 50% growth factor there was no direct correlation with cell proliferation.

Conclusions/Discussion

The STI571 was shown to effectively block the Bcr/Abl protein in Plate 4, and the growth factor then rescued the cells so that they worked like normal cells without Bcr/Abl. This shows that STI571 is an improvement over other cancer drugs that seek to destroy cancer cells, since it only seeks to destroy the cancer causing protein. However, STI571 was also found to have some non-specific toxicity, so it is not perfect yet.

Summary Statement

Cell proliferation techniques were used to find that STI571 effectively blocked the Bcr/Abl oncoprotein and that growth factor rescued the cells, as well as showing the non-specific toxicity of STI571 and thresholds of growth factor.

Help Received

Lab space and equipment was used at the University of California, San Diego under the supervision of Dr. Park Trefts and Mr. David Sykes. This was done through the Consortium of High Schools, Universities and Medical Schools Program.

Preliminary