CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
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Project Number
J0405

Project Title
Apoptosis: The Other Way Cells Die

Abstract

Objectives/Goals
The purpose of my project is to see how much Apo2L and Fas Ligand protein it takes to kill Jurkat cells by apoptosis in culture. If the Jurkat cells are not very sensitive to Apo2L or Fas Ligand, then to see if cross-linking each protein will help it kill the cells.

Methods/Materials
I added Apo2L and Fas Ligand protein, at different concentrations, to Jurkat cells in culture. I also added different amounts of an antibody that can connect or cross-link the protein molecules together. After incubating the cells with Apo2L, Fas Ligand and the antibody for 18 hours, I added alamar blue dye to the cells. Four hours later, I measured fluorescence from the alamar blue dye with the cells using a fluorescence plate reader. This let me know if the cells died or were still alive.

Results
I found that Apo2L or Fas Ligand alone could not kill the Jurkat cells, but when I added the cross-linking antibody with Apo2L or Fas Ligand, the cells died. The cells died the most when I added 6.25 ng/ml or more of either Fas Ligand or Apo2L with the cross-linking antibody.

Conclusions/Discussion
Apo2L, Fas Ligand or the crosslinking antibody alone did not kill the Jurkat cells. A combination of the antibody with Apo2L or Fas Ligand did kill the Jurkat cells. From this I learned that it is not only the amount of Fas Ligand or Apo2L that is needed to kill the Jurkat cells, but it is also how the Fas Ligand or Apo2L is presented to the cells. My project conclusions can be useful for scientists exploring the use of apoptosis proteins for cancer treatments.

Summary Statement
My experiments helped me find out how much Apo2L or Fas Ligand it takes to kill Jurkat cells by apoptosis in culture, and if this apoptosis needs each ligand to be cross-linked to kill the cells.

Help Received
My father taught me how to culture the Jurkat cells and make dilutions of the proteins I used. He also showed me how to use the plate reader. Genentech, inc. provided the cells, proteins and equipment. I performed all experiments for my project.