CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)
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Project Number
S0403

Project Title
Genotoxicity of Common Household Substances

Abstract

Objectives/Goals
The experiment that I have put together is designed to determine the genome toxicity of certain common household chemicals that allegedly cause cancer. I want to know how much truth there is behind the warnings stating that these substances are dangerous.

Methods/Materials
To figure this out, I used yeast cells as test subjects because their DNA replication and repair processes are similar to humans#. By using yeast I could conduct my experiment effectively without putting anyone in danger. For my purposes I used an assay for deletion formation to demonstrate the effect of different substances on the yeast. The assay allowed me to see when damage and rearrangement of the yeasts# DNA occurred. I put five filter paper disks on each of 15 selective medium Petri dishes with a set amount of yeast cells. Then I put a varying amount of each substance (with a control of zero) on every disk. By observing the increase or decrease in the growth of recombinant yeast colonies in response to the different substances, I can assess their genotoxicity and perhaps their ability to cause cancer. To reach my conclusion, I calculated the mean number of colonies that arose on each plate, and also the mean number that arose due to exposure to the chemical that gave me the most positive result (hydrogen peroxide).

Results
After I completed my procedure and collected al of my data, I concluded that only two of the chemicals were potentially harmful. One was hydrogen peroxide, which produced only a slight result after a lot of exposure. The other was bleach, which was so powerful in its smallest dose that it killed all of the cells.

Conclusions/Discussion
The results of my experiment support my hypothesis. Hydrogen peroxide triggered more, very small growths around the highest dose. This leads me to believe that hydrogen peroxide may be carcinogenic, but since the growths were so small, it would take a very long time for an individual to develop cancer from exposure to that product. In that time, an organism is more likely to die from exposure to the toxins than the development of a tumor.

Summary Statement
I used the yeast DEL assay to evaluate the potential carcinogenicity of five common household chemicals.

Help Received
My father , Dr. Adam Bailis, Phd provided me with the necessary instruction and equipment for performing my procedures. All of my experimentation was done in his lab at the City of Hope.