



**CALIFORNIA STATE SCIENCE FAIR  
2014 PROJECT SUMMARY**

<b>Name(s)</b> Aisha N. Patel	<b>Project Number</b>  34921
<b>Project Title</b> Don't Get Burned!	
<b>Abstract</b> <b>Objectives/Goals</b> The purpose of my project was to observe the impact of various pharmaceutical agents in prevention of damage to the skin cells against UV radiation. I hypothesized that all broad- spectrum sun protecting agents (titanium dioxide, zinc oxide, & avobenzone/oxybenzone) would be effective in preventing damage to the cells, but that the combination of avobenzone/oxybenzone would be most effective because it is chemical blocker. <b>Methods/Materials</b> *I used bacterial cells to simulate skin cells.* Tryptic soy agar plates were streaked with diluted bacterial cells using a calibrated loop. *I built an incubator at home using a Styrofoam box and a heat lamp.* Part1-agar plates were exposed to UV light for a specified time period. The control was not exposed to UV light. After exposure, plates were incubated for 48 hours. Number of simulated cells were observed and counted. Part 2- titanium dioxide, zinc oxide, and avobenzone/oxybenzone were spread onto separate plastic wrap sheets, which were then placed over the plates as a protected covering. Two controls were created. The plates were then exposed to UV light for specified time lengths. After exposure, plates were incubated for 48 hours. Number of simulated cells were observed and counted. *The experiment was repeated for three trials. <b>Results</b> After incubation, simulated skin cells not exposed to UV light were observed to have grown. Simulated cell growth decreased significantly with increasing time exposure to UV light. After covering the plates with titanium dioxide, zinc oxide, and avobenzone/oxybenzone, simulated cell growth significantly increased compared to the plates which did not have any pharmaceutical agents. However, the plates covered with zinc oxide were observed to have the most simulated skin cell growth. All pharmaceutical agents are very effective in preventing damage to human skin cells from the ultraviolet radiation of the sun and need to be used daily. <b>Conclusions/Discussion</b> The results proved my hypothesis partially correct. All of the pharmaceutical agents had a great impact in preventing sun damage to the cells. Zinc oxide had the greatest impact. Zinc oxide is recognized as a physical agent because it reflects and scatters sunlight. However, it also absorbs UV radiation by a process of electron excitation called band-gap absorption, and turns it into harmless infrared light which is disposed as heat, thus causing no damage to skin cells.	
<b>Summary Statement</b> I compared the effectiveness of different broad-spectrum pharmaceutical agents in preventing damage to the cells against UV radiation.	
<b>Help Received</b> Received help from parents.	