



**CALIFORNIA STATE SCIENCE FAIR  
2002 PROJECT SUMMARY**

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<b>Project Title</b> Examining the Detrimental Effects of Ultraviolet Radiation on Human Dermal Replacement	
<b>Abstract</b> <b>Objectives/Goals</b> We have chosen to do this project to explore the properties of the human dermis, the primary factor of genetic mutations and/or skin cancer, and to study the response of the Dermagraft, a type of human dermal replacement tissue, when subjected to various amounts of UV exposure. <b>Methods/Materials</b> For the experiment, we exposed several samples of the Dermagraft tissue to various amounts of UV radiation under the UV sterilization light in a standard Bio-hood. After the UV exposure, the cells were incubated overnight to allow regrowth and an MTT Cell Liability Assay and FACS analysis were performed to determine the number of apoptotic cells present. <b>Results</b> Qualitative results of the MTT Assay did not indicate a significant effect as all samples were stained dark violet, indicating that most of the cells present were still alive and had not experienced apoptosis. Nevertheless, a statistical analysis of the MTT readings showed that a direct proportion between the number of dead cells present and the amount of UV exposure time the samples had been subject to existed. However, the FACS analysis indicated that the difference between the ratios of apoptotic cells in each sample was not substantial enough to imply that UV exposure induces a major effect. <b>Conclusions/Discussion</b> The qualitative results of the MTT Assay did not indicate a significant effect nor did the FACS analysis indicated that the difference between the ratios of apoptotic cells in each sample was not substantial enough to imply that UV exposure induces a major effect. However, a statistical analysis of the MTT readings showed that a direct proportion between the number of dead cells present and the amount of UV exposure time the samples had been subject to existed. Also, by interpreting the results of the FACS analysis, we were able to determine that UV radiation induces a much greater percentage of necrotic cells than apoptic cells. Thus, we concluded that while exposure to UV radiation does have detrimental effects on human dermal cells, the level of exposure must be quite substantial to induce a significant effect.	
<b>Summary Statement</b> This project was an examination of the detrimental effects of short-term ultraviolet radiation on a human dermal replacement (Dermagraft) that emulates the basal layer of the human dermis.	
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