



**CALIFORNIA STATE SCIENCE FAIR  
2006 PROJECT SUMMARY**

<b>Name(s)</b> <b>Risha R. Bera</b>	<b>Project Number</b> <b>S1402</b>
<b>Project Title</b> <b>Examining the Effects of Organic Chemicals Present in Vehicle Exhaust on Wound Healing</b>	
<b>Abstract</b> <b>Objectives/Goals</b> Smoking hand studies have revealed that toxins in the smoke negatively affect surface wound healing process. The goal of this project is to examine the wound healing process with the influence of vehicle exhaust. It was hypothesized that the hazardous chemicals present in vehicle exhaust and in secondhand smoke will hinder the wound healing process because the rate of cell migration will significantly decrease. <b>Methods/Materials</b> The first step to testing the hypothesis was to collect vehicle exhaust in a medium that could be exposed to mice epithelial cells. A 1999 Chevrolet Suburban was used to collect emissions into a sterile liquid media by a plastic tube. A second tube leading out of the solution was connected to a small pump to ensure the flow of non-soluble gases out of the solution. Different concentrations of the solution was applied to various samples of cells, and then tested with a dye. The dye revealed that the ideal concentration of solution for the experiment was 1:10. The diluted solution was finally applied to test epithelial cells. Only untreated media was applied to control epithelial cells. Initial positions were marked and used to compare final positions. <b>Results</b> Migration distances were measured with the use of a light microscope. The migration distances of control cells were found to be nearly twice the migration distances of treated cells. <b>Conclusions/Discussion</b> Cells in close contact with vehicle exhaust have a slower migration rate than normal. This poses a problem in healing. As cells slow down, the cells are less likely to close the wound and allow full healing to occur across the wound surface. Cells in contact with vehicle exhaust are also more likely to accumulate at the edges of a wound, thus causing excess scarring by a buildup of connective tissue.	
<b>Summary Statement</b> This project showed that extreme amounts of vehicle exhaust negatively affect the rate of epithelial wound healing.	
<b>Help Received</b> Used lab equipment at University of California, Riverside under the supervision of Dr. Manuela Martins Green	