



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Risha R. Bera	Project Number S1401
Project Title Development of a Protocol Linking the Effects of Secondhand Smoke to the Effects of Vehicle Exhaust on Wound Healing	
Abstract Objectives/Goals Second hand smoking studies have revealed that the wound healing process is negatively affected by toxins in the smoke. The goal of this study is to examine the wound healing process with the influence of a simulated air quality. It is hypothesized that the hazardous organic chemicals common in vehicle exhaust and secondhand smoke will hinder the wound healing process in standard white mice. Methods/Materials The experiment was conducted by puncturing a 5-millimeter diameter wound in twelve white mice. Four mice were kept to a cage. Two of the cages were connected to an automated smoking machine from 10 PM to 5 PM every weekday. One cage of mice was only exposed to second hand smoke, and a second cage was only exposed to mainstream smoke. The third cage was placed in a normal environment to simulate a control group. The smoking machine smoked a pack of cigarettes every day. Results Tissue analysis showed that sidestream smoking caused cytoskeletal changes in the fibroblast. A decrease in cell migration also resulted in the wound area and led to the accumulation of cells at the edge of the wound. This prevented full wound healing and could potentially cause fibrosis and excess scarring. Conclusions/Discussion It is possible to apply the procedure used in the smoking study to study the effects of the environment on mice. An environmental chamber would be an ideal place to raise the mice. Dosages of chemicals could be injected into the chamber to simulate the conditions of outdoor air pollution; especially those caused by diesel fuel exhaust.	
Summary Statement This project used previous research to develop a protocol which examines the effects of vehicle exhaust on wound healing.	
Help Received Used lab equipment at University of California, Riverside under supervision of Dr. Mauela Martins-Green; tissue samples provided by UCR graduate student Robin Schleiff	