



**CALIFORNIA STATE SCIENCE FAIR
2010 PROJECT SUMMARY**

Name(s) Varun S. Sharma	Project Number S0418
Project Title Does Mitochondrial DNA Transfer Share the Same Path As Its Ancestral Bacteria?	
Abstract Objectives/Goals Our basic Objective/Goal of the experiment was to see if there was any indication of a possible Origin of Transfer Point from the mitochondrial DNA that entered the nucleus. Methods/Materials I cell cultured 143B Rho + bone cancer cells in 10 cm diameter petri dishes. After culturing enough cells, we counted them and placed an equal amount of these cells into a 4x6 well plate and covered them up with UV resistant covers. Next I uncovered the columns of four based off of time and the uncovered wells would be exposed to UV radiation from the Culture Hood. Then I centrifuged the nucleus and mitochondria separately and then put them through Q-PCR to obtain the results. Results I found from the data, that there was an interesting spike in nuclear DNA that derived from a region of the mtDNA, as indicated by primer set 6. This spike was noted after 8 minutes of exposure to UV Radiation (environmental stress). However, the results after 15 minutes of UV exposure did not follow our hypothesis that mtDNA will accumulate in the nucleus with time after stress due to the lower amount of mtDNA of that specific marker detected. Conclusions/Discussion The region in the mtDNA that was found to possibly be the Ori-T corresponds to the region that has been identified in evolutionary pseudogenes. I have developed a theory on why the spike in mtDNA encoded by primer set 6 after 8 min after stress may have occurred but did not persist at 15 min after stress. My Theory: The mitochondria have started to replicate their DNA initially after the stress in order to survive. Then they try to transfer their DNA into an 'F- cell', which is in fact the nucleus. However we see a decrease of the mtDNA region of primer set 6 in the nuclear fraction at 15 min compared to 8 min because part of the mtDNA was degraded by the UV radiation.	
Summary Statement Is there an Origin of Transfer point in the mtDNA that transfers into the nucleus?	
Help Received Used Lab Equipment at University of California San Diego under the supervision of Dr. Robert Naviaux.	