



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

Name(s) Ravi P. Deedwania	Project Number S1405
Project Title Effects of Nicotine on Cancer Cell and Endothelial Cell Proliferation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objective of this experiment was to determine the effects of nicotine on cancer cell and endothelial cell proliferation, which are both intricately involved in tumor growth.</p> <p>Methods/Materials Bovine pulmonary artery endothelial cells (CPAE), human colon colorectal adenocarcinoma cells (SW480), and human prostate carcinoma cells (LNCaP) were taken from confluent culture flasks and put into 24 well plates, 24 hours before administering nicotine. After 24 hours nicotine was administered in concentrations from 10^0 to 10^{-7} M. Cells were then incubated for 72 hours. After 72 hours results regarding cell proliferation were obtained using a phosphatase assay and colorimetric analysis.</p> <p>Results Nicotine induced significant cancer and endothelial cell hyperplasia (proliferation) at varied concentrations depending on the type of cell. Nicotine also was cytotoxic to the cells at the highest concentrations.</p> <p>Conclusions/Discussion The findings from this in vitro experiment document two different mechanisms by which nicotine, contained in tobacco smoke, can produce tumorigenic effects. Firstly, nicotine can act directly on cancer cells by inducing proliferation. Secondly, nicotine can induce hyperplasia in endothelial cells, which are essential to angiogenesis (the growth of new capillaries) and tumor metastasis.</p>	
Summary Statement The goal of this project is to determine the effects that nicotine has on cancer and endothelial cell proliferation, and its possible role in supporting tumor growth.	
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